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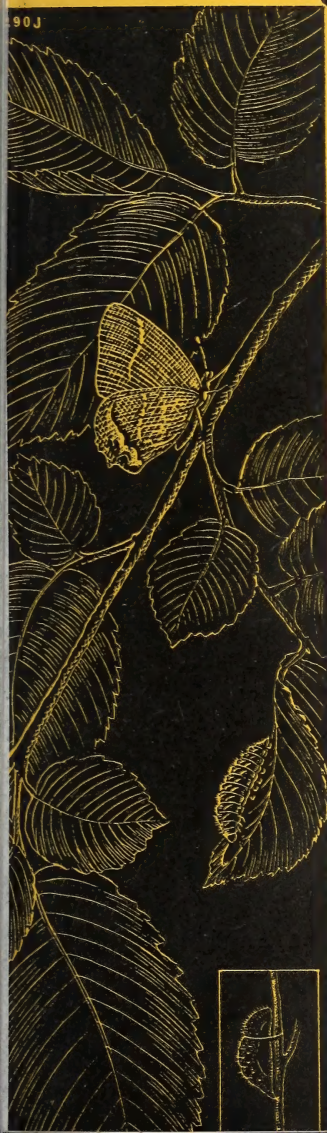
FEBRUARY, 1969



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**EDITED by DAVID CORKE, B.Sc.,  
L.I.Biol.**



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**EDITORIAL**

Here is the first *Bulletin* in its new style, which we hope will meet with members' approval. There are several reasons for the change—some saving in money for one—but more important is the fact that it will be easier to publish longer articles which can be reprinted as AES leaflets. Members can look forward to several publications of this sort in the coming year, the first of which appears in this issue.

A revised 'Guidance for Authors' is printed at the back of this *Bulletin*. Please make an effort to follow these guide lines. When the editor is expected to re-type whole articles this not only delays publication of the article but also of the whole *Bulletin*.

D. Corke (2962)



**MEMBERSHIP LIST**

The membership list sent out with the November *Bulletin* included new members who joined before the end of December 1967. Members who joined in 1968 will be included in a supplement to be published with the May *Bulletin*.



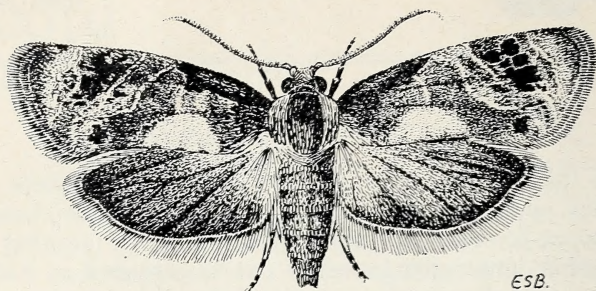
**COLLECTING NOTES—FEBRUARY 1969**

**The Smaller Moths**

*Batodes angustiorana* Haw. Mr E. S. Bradford writes: 'The larva of this moth is fairly common on a yew hedge (*Taxus baccata* Linn.) near my home in some years and I have bred a number of the adult moths. I have also found the larva, again on Yew, in the grounds of a dilapidated old house and have taken the adult on apple trees (*Malus* spp.) in my garden. The larva is one of those which wriggle violently and tend to drop down when alarmed.'

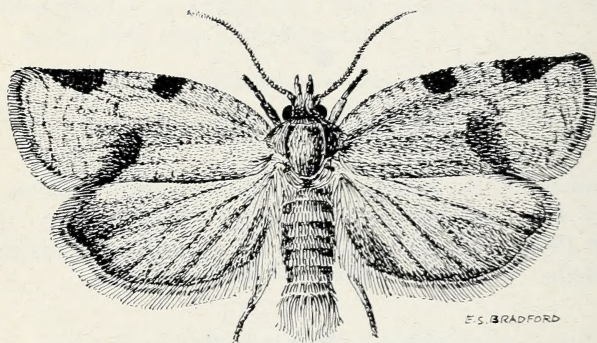
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*Front cover illustration:* Larva and imago (pupa inset) of the White-letter Hairstreak (*Strymonidia w-album* Knock) on Wych Elm (*Ulmus glabra* Huds.), drawn by Mr. J. Cooter (3290).



ESB.

*Batodes angustiorana* Haw. (Wing span 15 mm.)



E.S. BRADFORD

*Lozotaenia forsterana* Fab. (Wing span 14.5 mm.)

'The main colour-scheme of the imago's forewings is a mottling of browns with black patches. The hindwings are a dark brownish black. The moth is on the wing in June and July.'

This moth has more foodplants than the text-books mention. I have bred it from Scots Pine (*Pinus sylvestris* Linn.), Honeysuckle (*Lonicera* spp.), Blackthorn (*Prunus spinosa* Linn.) and Oak (*Quercus* spp.). The larvae may be found, at any rate on the last named foodplant, during the winter months. In March 1967 I noticed dead oak-leaves which had not fallen and found that they had been spun on to the branches and contained hibernating larvae. I had no idea what they were and collected a few. They started feeding again when the buds burst, and from them I bred four *B. angustiorana* in June.



*Lozotaenia forsterana* Fab. Mr. Bradford gives the following notes: 'The drawing of this moth is from a specimen I bred in 1967. The larva was taken early in the year feeding on Hawthorn (*Crataegus* spp.). It eventually emerged on the 18th June. Its most common foodplants are Ivy (*Hedera helix* Linn.) and Privet (*Ligustrum vulgare* Linn.) and it has also been recorded on *Vaccinium* spp. The moth depicted is a rather strongly marked specimen compared with the others I have, but many bred specimens look better than those caught, having lost few, if any, scales. The overall colour is a grey brown, the hindwings being somewhat lighter. The two darker patches on the costa and the slightly paler one before and leading into the tornus are vandyke brown in colour. As the span marks show, it is one of the larger of the Tortricidae. I have specimens mainly from Hertfordshire and have taken it at Whitstable, Kent. It is fairly common.'

I can confirm that *L. forsterana* feeds on *Vaccinium*, since I bred six specimens from larvae taken on Cowberry (*V. vitis-idaea* Linn.) in Derbyshire. The larvae are perhaps most easily obtained on Ivy, and can be collected in the early months. They overwinter between spun leaves, when their feeding appears as conspicuous pale blotches. Late last February I found several on the Ivy sprawling under a hedgerow in west Kent; they were then just beginning to feed again after the winter.

On the same day I collected a number of larvae of *Pammene regiana* Zell. They feed in September in the seeds of Sycamore (*Acer pseudoplatanus* Linn.) after which they descend the tree to spin up behind flakes of bark at the base of the trunk. They hibernate in their cocoons and do not pupate until a few weeks before emergence. Though I bred a short series of moths in June from the material I collected that February day, there were also many casualties; this I attribute to tearing the cocoons and thus upsetting the larvae. Thus, though the winter is a good time to locate a colony of *P. regiana*, it would be better to delay collecting them until mid-May, when most should have pupated.

Another early moth is the 'Nep', *Stigmella suberivora* Staint., which mines the leaves of the Holm Oak (*Quercus ilex* Linn.) making galleries. According to Meyrick, this species is confined to Ventnor in the Isle of Wight, but, though his statement may have been true when he was writing, the moth now has a much wider distribution. I have seen mines at Weymouth in Dorset and Thorpeness in Suffolk as well as in Kent, Epping Forest and the London district. But it is not to be found everywhere in the south-east; for example there was no trace of it in an extensive growth of Holm Oak in the Gog Magog Hills near Cambridge. Its occurrence should therefore be reported so that its present distribution can be worked out. The books say that the larvae feed in April, but I have only been able to find empty mines in that month. Last year Mr Wakely took the larvae full-fed in late March near his home in Camberwell. The moth is out from the end of April and is single-brooded.

Early April is the best time to look for the mines of *Laspeyresia*

*servillana* Dup. The larvae feed in the thin stems of Sallow (*Salix* spp.), usually in the previous year's growth, and cause a very slight swelling; with a little practice this is quite easy to spot, especially if you look before the leaves come. The exit hole is usually situated just above a bud, and is filled with silk or frass. If you snip off the stem a few inches above and below the swelling and then stand it in damp sand (as is recommended for stems containing clearwing larvae), you should have no difficulty in breeding this pretty little moth in May.

A moth which is on the wing in April is *Cheimophila salicella* Hübn. I take this in Essex on the same ground as *L. servillana*. It is Forestry Commission land with alternate rows of spruce and oak saplings and an undergrowth which includes Sallow and Meadow Sweet (*Filipendula ulmaria* Linn.) both of which are foodplants of *C. salicella*. The moths fly in the afternoon sunshine and cannot be disturbed in dull weather. I once found one at rest in a branch which I tapped to see what the moth would do; it did not fly but fell straight to the ground and vanished in the herbage. The female has greatly reduced wings and is incapable of flight. I have never seen a wild female but have bred them from larvae taken on Meadow Sweet at Wicken Fen.

A. M. Emmet (1379)

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### Hymenoptera Aculeata

I have often commended to readers of this series the study of the fauna of their own gardens. At first sight this might not seem a particularly fruitful study. Gardens are extreme examples of an artificial environment and as such seem an unlikely source of useful ecological information. The chief stimulus to garden collecting of Aculeates is their extreme dependence on fine weather. We get little enough of this in Britain and full advantage can be taken of short spells of sun in one's own garden.

I have recently written of trap nesting and in fact a garden can be thought of as a large trap attracting the species from the surrounding fauna appropriate to the microhabitats provided. When considered in this way, it will be seen that much useful distributional and ecological data can be gathered. Negative records become meaningful in a well studied garden. Data on the mobility of species and minimum viable colony size can also be gathered.

So with these ideas in mind, I want to discuss means of rendering a garden attractive to Aculeates. Several aspects have already been covered in the Hymenopterist's Handbook. On p. 82 A. H. Hamm gives an account of the interesting fauna attracted to a pair of old willow posts



artificially drilled with suitable holes, while on p. 84 the 'bee wall' of Professor F. Balfour-Browne is discussed. The improved rearing devices described by G. S. Kloet on p. 94 are useful adjuncts to the trap nests that I have recently dealt with in these notes. These ideas all concern the provision of attractive nesting sites. The aspect I wish to deal with here is the provision of appropriate plants which can provide food and resting sites in addition to nesting sites.

In the spring the first Aculeates to appear are usually queen bumble bees. The early flowering varieties of *Erica carnea* Linn. are very attractive to these, as is Flowering Currant, *Ribes sanguineum* Pursh. Both queens and workers of *Bombus* spp. are also attracted to *Cotoneaster*, particularly *C. horizontalis* Decaisne. *Andrena* spp. are also attracted, and I have taken a *Vespula sylvestris* (Scop.) queen at this flower. Among other shrubs with attractive flowers, *Weigelia* must be mentioned, and also Lavender, *Lavandula spica* Linn. The latter is particularly useful for the large number of males of *Bombus* and *Psithyrus* that visit it. *Anthophora quadrimaculata* (Panz.) will also visit Lavender.

Several shrubs are more valuable for the resting or sunning sites provided by their leaves than for their flowers and here in particular I include Lilac (*Syringa vulgaris* Linn.). The broad leaves expanded fairly early in the year are much frequented by *Cemonus* and *Passaloecus* males. Laurel, *Prunus laurocerasus* Linn., I also rate very highly in a garden. Many species rest on the leaves, not a few visit avidly the foliar nectaries, and *Andrena* males course up and down the top of a Laurel hedge in their mating flight. Then there are the shrubs, particularly *Forsythia*, which are of most interest for the nest sites provided by their hollow stems. In my own garden *Rhopalum clavipes* (Linn.) is a regular nester in this species. Snowberry, *Symphoricarpos rivularis* Suksdorf, is an interesting plant for several reasons. It is a food plant of that striking Sawfly, *Zaraea fasciata* Linn., and the flowers, as well as being visited by bees, are attractive to wasps. In my present garden the only *Vespula rufa* (Linn.) and *V. sylvestris* (Scop.) workers I have taken have been at these flowers.

Soft fruits are another rich source of captures. Raspberry, *Rubus idaeus* Linn., is triply useful: the flowers are freely visited, the leaves act as sunning sites and old hollow stems provide nesting sites. The flowers of Gooseberry, *Ribes grossularia* Linn., and Blackcurrant, *R. nigrum* Lin., are also attractive. However, the main interest of Gooseberry lies in the sawflies commonly associated with it. *Nematus ribesii* Scop. occurs virtually every year with three, or perhaps even four, generations in a 'good' year. Whenever I have searched diligently in my present garden a few larvae of the less common, single-brooded *N. leucotrochus* Hartig have been found though at only about ten per cent of the abundance of *N. ribesii*. I have not as yet found the third member of the group, *N. olfaciens* Benson, on Blackcurrant in my own garden, although it does occur in the district. I find the chief interest of Blackcurrant lies

in the attractiveness of the leaves as sunning sites for many small wasps and bees.

Ornamental flowers should, of course, provide much of the interest in a garden, though this is an area I have least explored. Many flowers are attractive to *Bombus* spp., including *Delphinium*, and later in the season Dahlias, particularly the single varieties. Specific flowers can be chosen for particular bees. It is always pleasing to take *Chelostoma campanularum* (Kirby) at flowers of the dwarf *Campanula*. Yellow composites attract a variety of short-tongued bees. *Doronicum* is a useful early flowering form, followed later by the white and yellow-rayed Marguerites, *Chrysanthemum frutescens*. It was at this flower that I first took that fine bee *Dasypoda hirtipes* Fab. One particularly interesting composite is Yellow Chamomile, *Anthemis tinctoria* Linn. This flower is much frequented by *Colletes daviesana* Smith. Both species made their first appearance in my garden this year, the *Anthemis* self-sown. Two other species that can maintain themselves self-sown in the garden are Foxglove, *Digitalis purpurea* Linn., and Purple Toadflax, *Linaria purpurea* (Linn.) Mill. The former species is particularly visited by *Bombus hortorum* (Linn.), the latter by a number of bees, including *Anthidium manicatum* (Linn.).

It is a short step from these self-sown flowers to actual weeds and I suppose an entomologist's garden is notorious for the weeds he deliberately succours. From the Red Dead-nettle, *Lamium purpureum* Linn., so useful in the early spring, through yellow composites, such as Nipplewort, *Lapsana communis* Linn., and *Crepis capillaris* Wallr., to Black Horehound, *Ballota nigra* Linn., in the autumn, my garden captures would be much the poorer without weeds. Even Chickweed, *Stellaria media* Vill., has its interest, being visited by several small bees including *Prosopis pictipes* (Nyl.).

I hope these few notes stimulate my readers to observe more closely the plants in their own gardens and perhaps to try some new ones.

30.10.68.

J. C. Felton (3740)

#### REFERENCE

COOPER, B.A. (ed.), (1943) The Hymenopterists' Handbook. *Amat. Ent.* 7.

### The Diptera Syrphidae

I have recently taken on the task of producing a series of articles on this group, in the hope of stimulating some interest in British hoverflies. At present I will be producing two articles a year, but I hope to increase this to four in the near future. I will use this article to give a general idea of the equipment which will be needed. This will, of course, be based on my own experience, you may have ideas of your own. If so, I would be very pleased to hear them.



British Syrphids vary in size from *Paragus tibialis* Fallen (range of wing-length 3-4.5mm) to *Volucella zonaria* Poda (range of wing-length 15.5-19.5mm) and a net with reasonably fine mesh is needed. I use a folding net with a mouth diameter of about 14 inches. A strong, fine-mesh sweeping net will also be found useful when collecting the very small species.

I have found that the best killing agent is ethyl acetate, used in the normal type of killing pot with Plaster of Paris in the bottom. Using ethyl acetate leaves the insects supple enough to be easily set up to twenty-four hours after killing. Besides my killing pot I carry a selection of small glass vials with plastic stoppers. When I leave a locality I transfer the catch for that area from the killing pot to one of the glass vials. The insects' bodies have absorbed enough of the vapour to keep them relaxed until they are set.

Most of the collectors I have met pin Syrphids with White No. 20 pins through the thorax. I personally set my insects in the normal 'at rest' position, but some people prefer to set them on the side. After pinning the fly through the thorax I set it on a flat piece of polystyrene (12 or 14 inch square ceiling tiles are excellent for this) holding the legs and wings in position with small pins. The two posterior legs are set to the rear of the insect and the four anterior ones to the front. The wings are set either at right angles to the body or slightly more forward than this. The insects will be dry enough to be removed from the setting boards after about a week.

For ease of handling, Syrphids are usually staged on thin card or cellulose strips. The type of pin used to take the stage and data label depends entirely on individual taste; I use 3 inch long black continental style pins, although this means that the final collection has to be arranged in deep, as opposed to the shallower English, boxes. Arrangement of the collection is again a matter of individual taste, and again, no hard and fast rules can be laid down.

I identify most of my Syrphids using Coe (1953), but the beginner will find Colyer and Hammond (1951) most useful. In addition, if you are interested in collecting Diptera in general, there is an AES leaflet by Parmenter which should prove helpful.

In the next article I will tell you how to go about the actual collecting of hoverflies, for example, the best type of locality to visit, and what to look for when you get there. Meanwhile, if any of you wish to write to me personally, I shall be pleased to hear from you.

15.9.68.

Alan J. Brown (3854)

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COLYER, C. N. and C. O. HAMMOND (1951) *Flies of the British Isles*, Warne, London.  
PARMENTER, L. (1951) Collecting Flies. *Leaflet. Amat. Ent. Soc.* 5.

## COLLECTING FLEAS (SIPHONAPTERA)

### Life cycle of Fleas

Fleas are small (1–8 mm. in length), laterally compressed, wingless, usually hairy and shiny, blood-sucking insects (Fig. 1) which, in the adult stage, feed solely on the blood of warm-blooded vertebrates, that is birds and mammals. They vary in colour from yellowish through shades of brown to a deep brownish-black, the species infesting mammals tending to be lighter in shade than those infesting birds though by no means is this an inviolate rule: *Megabothris walkeri* (Rothschild), a microtine flea, is fairly dark whilst the three *Ceratophyllus* species commonly inhabiting house martin nests in Great Britain are very pale.

Fleas have a holometabolous metamorphosis, egg—larva—pupa—adult, the immature stages normally being found in the nest material or dung (bat-fleas) of their hosts whilst the adults vary in habitat between the extremes of stick-tight fleas in which one sex, normally the female, becomes more or less permanently attached to the host and those which stay on the host-body for quite short periods and are more frequently found in the nest material. However fleas are frequently found loose in situations where they have obviously dropped from the host or migrated from a nest.

The eggs are minute, white, oval, hard objects which, unlike nits, the eggs of lice, are not attached to the vestiture of the host. From them emerge elongate, hairy, legless, eyeless larvae which have biting mouth-parts and feed on organic debris, i.e. they are not parasitic. The pupae are contained in silken cocoons to which are often attached quantities of fine debris from the surroundings. Emergence is from the truncated end of the cocoon and often can be initiated by mechanical stimulation such as vibration, the arrival of a bird at the nest, a gross movement of the host through the nest material or artificially by the collector rubbing the nest material through his fingers.

The world fauna is but imperfectly known and the most recently published total of 1,863 species and sub-species, of which 56 are considered to be British, is certainly considerably short of the final figure. Many species are highly host-specific, e.g. *Archaeopsylla erinacei* (Bouché) which restricts its attentions to hedgehogs and if found on other hosts must be considered to be straggling, whilst others, e.g. *Ceratophyllus gallinae gallinae* (Schrank) has already been recorded from at least 80 species of British birds. Some are restricted to groups of hosts, e.g. *Palaeopsylla soricis* (Dale) and *Doratopsylla dasyncema* (Rothschild) which are found on shrews and the *Ischnopsyllidae* which are exclusively bat-fleas, whilst others, such as *Ceratophyllus garei* Rothschild which is found in birds' nests at or near ground level, tend to be limited to types of habitat.

It is obvious, therefore, that a siphonapterist has to be in some degree a mammalogist, an ornithologist and an ecologist besides being



an entomologist if he is to obtain the maximum benefit, interest and scientific value from his collecting activities. In addition he will need to take every available opportunity to persuade his colleagues to collect wherever they study birds and mammals in the field. He will be frustrated only too often by news of lost collecting chances, especially those in little-collected areas, and he will be glad to accept specimens, even single individuals, from anywhere. Even more than most entomologists he will have to suffer the jibes and jokes of those who are not naturalists whilst even other entomologists will look upon him with mild amusement. However he will rapidly become a master at identifying his local fauna, will be able to be in contact with every other siphonapterist in his own country and will be able to add to distributional knowledge from almost everywhere he collects.

Fleas may be collected from the bodies of their hosts or from nest material. In general the latter source produces the larger quantities.

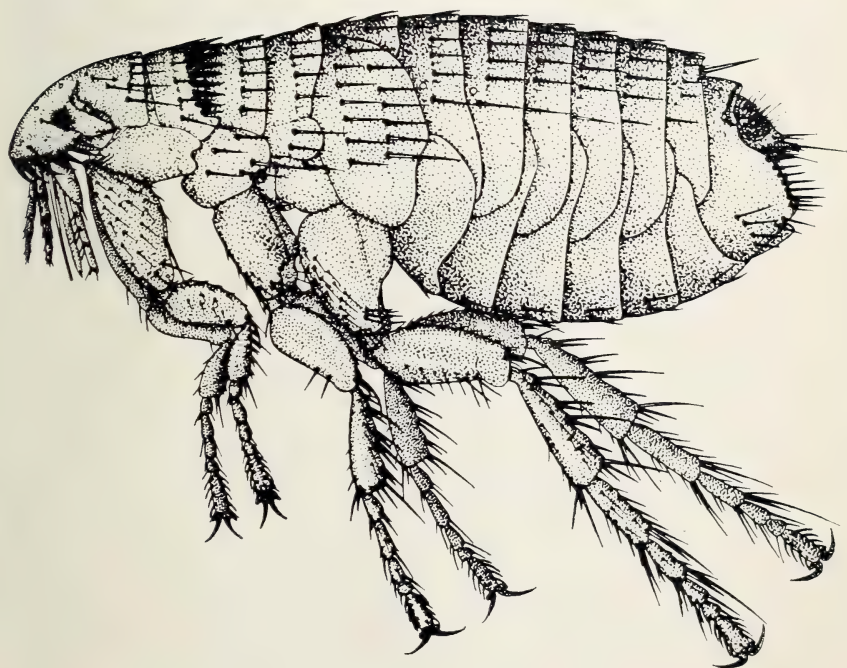


Fig. 1 Female *Ctenocephalides felis felis* (Bouché), The Cat Flea. (With acknowledgements to F. G. A. M. Smit.)

The collecting methods vary with the size of the host, the accuracy and completeness of collection required, time and equipment available and, generally, can be done with very little difficulty provided reasonable precautions against personal infestation are taken.

### **Collecting from nests**

Nest collection provides the largest number of species and specimens and is by far the best way of collecting males of some of the stick-tight fleas. Unfortunately it is not always possible to be absolutely certain of the host species. The nest material should be stored in tightly sealed polythene bags, though these may soon be punctured by lepidopterous larvae also occupying the nest, or in well-sealed tins. At the collector's convenience the material can be subjected either to extraction procedures involving the use of Tullgren or Berlese funnels or searched manually. The former method is convenient if time is short and many nests need to be examined but produces far smaller gatherings than manual methods.

The collector who needs to examine the occasional nest needs very little equipment, merely: two containers (tins or polythene bags), a steep-sided, white bowl, dissecting needle or stork-bill forceps, a large sheet of white paper or cloth, specimen tubes containing 70% alcohol (never formalin). Ideally he should wear a white shirt and work with sleeves rolled up and a white cloth across his lap. A small portion of the nest material is transferred from the container to the bowl which should stand in the middle of the white paper. The material is shredded and massaged with the finger tips, when any adult fleas present will soon be seen and most of those lying dormant in cocoons will be stimulated by the massage and emerge with a rush. These specimens can be collected on the alcohol-moistened tip of the dissecting needle or with the stork-bill forceps and placed into the specimen tube. Before a batch of the nest material is discarded by placing it into the second container it should be massaged several times, for some individuals require considerable stimulation before emergence occurs. It is possible to break open the truncated end of the cocoon with a very fine needle and release otherwise reluctant movers. I have taken over four hundred specimens from the nest of a St. Kilda Wren in this way after a very small collection resulted from massage. It is rare that a complete collection will be made, a considerable portion of the nest's population inevitably being in immature stages, and, for perfection, the material should be examined on several occasions, but I doubt if the time involved is commensurate with the results obtained. Conversely the dehydration involved in funnel methods of extraction effectively prevents any second gatherings being made. Now and then a flea will escape from the bowl but is immediately obvious on the white sheet or the bare arms of the collector who will gather in the escapee straight away. This method will often produce several hundreds of specimens per nest compared with the few scores



extracted by funnel methods and obviously gives more accurate statistics for species/population studies and more readily shows up any species which may be present in very small numbers. It is the easiest way of collecting bird fleas.

As an alternative to individually removing the fleas a pooter can be used, but a dust filter must be inserted into the system and even then the task is not very pleasant.

Mammal nests are often very hard to find but searching round the base of large tussocks of grass is often productive of vole nests. Mole nests can be found in the early spring under the large 'fortresses' of loose earth raised above ground level in meadows. These very large heaps should not be confused with the smaller piles that appear every few yards along the track of the mole-runs. The nest chamber is usually below ground level and occasionally a 'basement chamber' is a few inches below the upper floor. Pieces of corrugated iron, say about a yard square, spread around in meadows and the borders of woodland may encourage small rodents to nest underneath in the shelter thus provided. It is advisable to obtain the land-owner's permission and not to put the pieces where they are liable to interference by the public. It is only courteous to remove the ironwork when the study is complete. Squirrels nest in dreys but grey squirrels often use holes in tree trunks. The same holes may contain colonies of bats or nests of a wide variety of birds. When collecting birds' nests the provisions of the Bird Protection Acts and Regulations must be remembered and as a general rule the nests should not be taken before the fledglings have flown. Apart from the legal angle this is the best time for a maximum population of fleas.

### **Collecting from host animals**

Most mammal fleas are collected from their hosts' bodies more easily than from the nests and this is almost the only way of collecting bat fleas. Human fleas are generally collected from bodies! On the other hand bird fleas are rarely taken from birds except by bird ringers and students at bird observatories. The bodies may be collected by shooting, trapping, netting, alive or dead according to species and facilities or by the casual collection of corpses on our roads. Bats should be hand-gathered at the roosts or mist netted and great care taken of these fragile animals. The methods of flea collecting vary according to the size of the body:

(i) **LARGE BODIES** should be visually examined first of all and specimens tubed. Then the body can either be placed in a large polythene bag with some anaesthetic and afterwards brushed over a sheet of white paper or can be hung over a wide pan of water containing a little detergent. As the fleas drop into the water they sink and drown to be collected later.

(ii) **MEDIUM BODIES**, such as squirrels, rats and hedgehogs should be placed in a polythene bag and treated as a large body. If the host is to be kept alive the anaesthetic should be ether and a glass container

used for the body. Searching must commence the moment the animal becomes unconscious. As an alternative piece of apparatus the collector could adapt the Williamson apparatus which was originally designed for removing the ecto-parasites of birds but there is no reason why, in an altered form, it should not be used with mammals. The basic pattern is described in the section on living birds.

(iii) SMALL BODIES, such as those of mice, voles and shrews, are most easily obtained by trapping. If live-release is an objective very slight anaesthesia should be obtained with ether or the animal can be held by the scruff of its neck over white cloth and the collector then blows through its fur. Most of the fleas will hop off and get entangled in the cloth fibres. A few workers use insecticides such as those sold for cleaning-up cats and dogs. It is unfortunate that live-traps are expensive and bulky, but as most species of small mammals are so common losses resulting from nipper-trapping, these traps being small, light, cheap and therefore expendable, make negligible effects on the populations (this may not be valid comment for very small islands or restricted or specialised habitats). The equipment needed when running a trapping line is: supply of traps, one large tin, supply of cloth or paper bags (old envelopes are very convenient), anaesthetic, collecting tubes containing 70% alcohol. If possible the traps should be set in a straight line as this facilitates finding them after dark. The trap-line should be examined at least twice a day, as soon as possible in the morning and as late as possible at night, and the following procedure followed at each trap containing a body. An open bag is placed on the ground close to the trap, which is then gently lifted and lowered into the bag. Only then is the body released from the trap. The bag is rolled up, placed in the tin with a small amount of anaesthetic, the trap rebaited and reset and the tour of the trap-line continued. By the completion of the tour and reaching base all the ecto-parasites will be dead and the collector can examine the catches one by one with no personal danger of infestation. Each bag is examined individually, all ecto-parasites are removed, tubed and labelled and records are made up. Ideally the bags should never be re-used, thus completely avoiding any risk of accidental, inaccurate host/parasite records. The advantage of old envelopes becomes obvious as the cost is nil.

No matter whether the mammals are live-trapped or nipper-trapped it is almost certain that some fleas will have left the host's body before the collector commences his work. Nesting material and food must be placed in a live-trap. This often contains a significant proportion of the original flea population and should be examined. In fact work based on examination of live-trapped hosts where adequate precautions have not been taken against cross-infestation between successive hosts must be considered as faulty.

Certainly transference problems do not arise with nipper-trapped hosts but the total catch can be increased by a very close examination of the soil immediately below each trap. However this takes a great length



of time and one does tend to get very wet knees!

(iv) BAT FLEAS should always be collected from live hosts as bat populations, at least in Great Britain, are rarely large. The apparatus is a jam jar, ether and blotting paper. The bat is put into the jar, three drops of ether put on a small piece of blotting paper and added to the jar which is then closed by hand. Immediately the bat becomes unconscious it is tipped out and searched; usually it will recover within a few moments. Occasionally bat fleas can be found in the droppings which accumulate below a colony roosting in a confined space and certainly the dipterist can breed interesting things from the droppings.

(v) LIVING BIRDS should be examined with the use of the Williamson apparatus which is both fragile and expensive. Basically it is a piece of oiled silk with a small slit in the centre and a jam jar containing a wad of cotton wool moistened with ether. The bird's head is placed through the slit and the body of the bird is lowered into the jar. The silk covers the mouth of the jar thus preventing the escape of ether fumes and loss of life of the bird. As the bird flutters the parasites among its feathers are affected by the ether and drop off for collecting later. It is essential that the jar is scrupulously cleaned between examinations to prevent cross-collecting.

### Labelling

It is desirable that each collection, i.e. from each nest or each body, should be tubed separately and essential that each tube should be adequately labelled. Whilst field work often requires numbering of tubes, the numbers corresponding with the full data of a record book, it is a fault to leave the tubes in a numbered condition as record books can so easily be lost or separated from the material which then becomes relatively useless. Furthermore few numbering systems are unique and the mixture of batches of numbered tubes can lead to utter confusion. The data should include: host species, sex, state of maturity, whether from body or nest, locality with sufficient precision for other workers to map, county and country where appropriate, date of collection and collector's name all written either in pencil or indian ink on a piece of paper placed inside the tube. If museum skins result from the bodies it is valuable for the skin reference number to be added. If collecting is done in mountainous districts the altitude of the collecting site, not of base, should be added.

Inevitably in this work other ecto-parasites will be seen and can be collected for passing on to the appropriate experts. The parasites will include lice, ticks, mites, flies and beetles; all are of interest and should not be wasted.

### Identification

The British species can be identified with comparative ease with the use of F. G. A. M. Smit's very good handbook (*Handbooks for the Identification of British Insects*, 1 (16), (1957), Royal Entomological

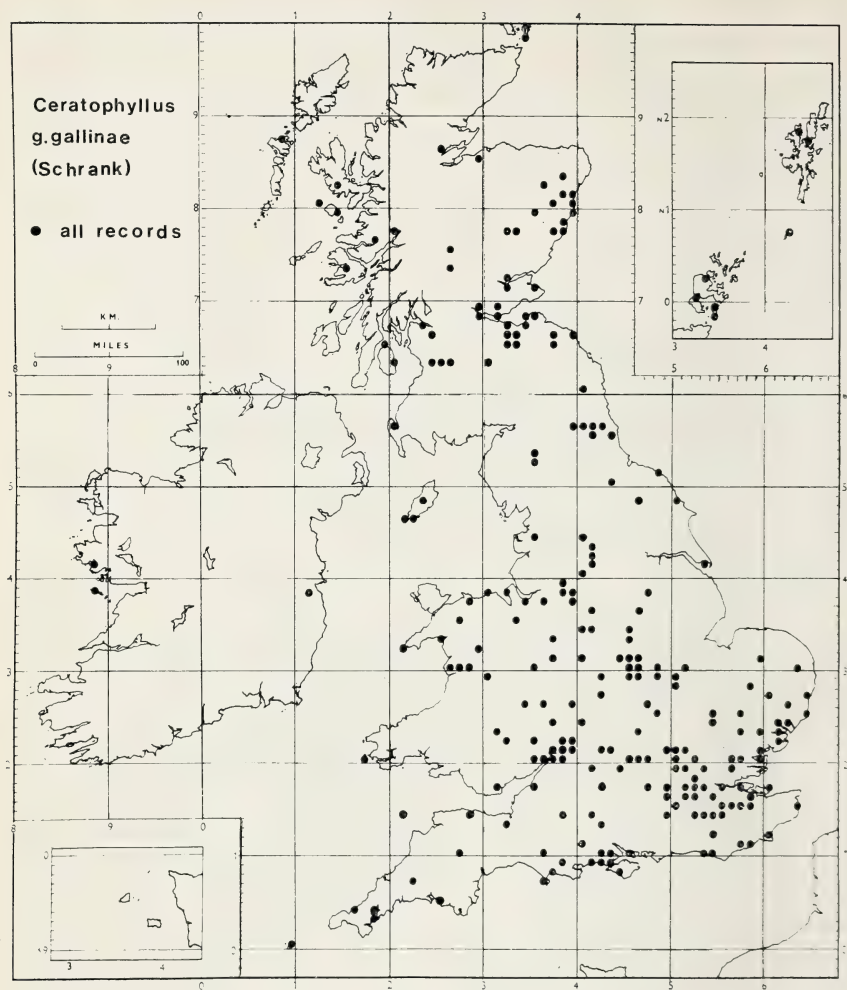


Fig. 2 The recorded distribution of *Ceratophyllus gallinae gallinae* (Schränk), The European Hen Flea, within the British Isles.

Society of London). This publication also contains full instructions for the processing of specimens in preparing microscope slides. The same author in *Ent. Gaz.*, 8: 45-75 has provided a most detailed host list, county list and bibliography, while the same journal will carry more recent lists. The world fauna is being covered by the superb monographic series of volumes of G. H. E. Hopkins and M. Rothschild (*Catalogue of the Rothschild collection of fleas (Siphonaptera) in the British Museum (Natural History)*) published by the B.M. (N.H.)). So far four volumes



have appeared and several more are envisaged. The mapping of the British fauna is now being done by the Biological Records Centre of the Nature Conservancy and the maps so far produced illustrate very adequately the great need for more collecting of even the commonest of species (see Fig. 2). The need for material from overseas is far greater and there must be many more species and sub-species to be discovered from most parts of the world. Island faunas, the nests of burrowing birds, woodpeckers, tropical bat roosts, armadillos, pangolins, desert rodents, could all be profitable. There is a lot of flea collecting to do and the entomologist on holiday overseas should never consider himself without the opportunity to do some useful collecting; the gathering of a single nest could have interesting results. I think it was N. C. Joy who said the coleopterist should never be without a specimen tube, similarly the siphonapterist should never be without a polythene bag.

R. S. George.



### A POPULATION STUDY ON THE SCARCE *ISCHNURA* (ODONATA, ZYGOPTERA)

On July 13th, 1967, Mr M. J. Parr and the authors set out for a few days camping near Brockenhurst in the New Forest. Our reasons for camping there were twofold: (a) to do some collecting and (b) to conduct a preliminary survey on the status of *Ischnura pumilio* Charpentier (The Scarce Ischnura) in the area. We intended to find as many colonies as possible and then to revisit the forest another year to conduct a capture-recapture survey on one of them.

Most of the fourteenth of July we spent searching for *Ischnura pumilio* around Brockenhurst, but we were unlucky, and in the end resorted to collecting Lepidoptera which were numerous. On July 15th we set out towards Ringwood and after we had travelled about two miles, we left the car on the road and set off to investigate some drainage ditches. We were immediately lucky and several specimens of *Ischnura pumilio* were identified. The males are easily distinguished from *Ischnura elegans* Van Der Linden (The Common Ischnura) males by their lesser size and the blue ninth segment. We spent the rest of the day in the area as all forms of insect life were very abundant.

Early the next morning we discovered another colony less than half a mile from our camping site, while collecting wood. The damselflies had not started flying, as it was still too early in the morning, but they could be identified as they rested on the grass blades. Later in the morning we visited Beaulieu Heath and by the end of the day we had discovered two more colonies.

July 17th was our last day and we only found one more colony.

This was situated around a bomb crater pond and was also near our camp site.

In all we had found five colonies and we were very pleased with this. Three of the colonies were situated around drainage ditches and the other two were situated at ponds. We were greatly helped by the weather as it was ideal, there was no rain, only a slight wind and sunshine most of the day. We decided to return in 1968 and conduct a survey on the bomb crater colony.

We returned on July 5th, 1968, but were unfortunate as Mr Parr was unable to accompany us and this meant we had no transport. Also the weather was very bad and we were subjected to heavy rain and winds each day which made insect collecting nearly impossible.

The bomb crater colony was no longer there, but we managed to discover a further two colonies of *Ischnura pumilio* and we decided to attempt a capture-recapture survey on one of them. (One of these colonies was very near the bomb crater, in a position where previously there had been no colony, so conceivably it could have been derived from the individuals associated with the crater in 1967.) Even though the weather was so bad we managed to spend about an hour each morning on the survey, and considering the weather, the number of captures was fairly good (we did not expect to catch any!). As it was, we captured very few females and we decided not to include them in our survey.

The area of the colony under surveyance was approximately 1,500 square yards, it was bordered on one side by a narrow marsh with free water and on the opposite side by a drainage ditch. The area in between was semi-marshland (probably due mainly to the heavy rainfall).

The damselflies were surprisingly difficult to isolate from their surroundings and the dull weather did not help matters. We also found them very difficult to capture as even the weaker gusts of wind were sufficient to carry them away at great speed. When the weather was very dull it was found necessary to disturb the insects from rest as they seemed reluctant to fly except when it was sunny and dry. On the release of captured specimens it was noted that they invariably flew with the wind which was predominantly northerly. The fact that their flight direction seemed dependent on wind direction could account for the moving of colonies which has been recorded on several occasions.

### Field Procedure

The damselflies were caught in butterfly nets in the normal way and were then transferred to paper envelopes with their wings folded over their backs. After their collection each one was removed from the envelope, given a unique mark and released so that they rejoined the colony uniformly.

It is not absolutely necessary to use unique marks but their use does enable more useful information to be derived from the survey. If they are not used, a coloured paint mark is placed on the wing and this



## BINARY SYSTEM



eg. 105



## DECIMAL SYSTEM



eg. 46

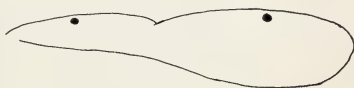


fig. 1

denotes a particular day of capture. Each subsequent day it is captured it is re-marked with the appropriate colour for that day. If unique marks are used there are two common systems, the binary and the decimal. A series of dots are placed on the wing(s) of the damselflies to represent a number. Each insect thus has a unique mark (see fig. 1).

We decided to use the decimal system as its use normally entails placing less dots on the wings, and as we were very inexperienced, we thought it would be easier. (The only previous capture-recapture survey we had done was on *Chorthippus parallelus* Zetterstedt (Meadow Grasshopper) using non-unique marks.) We placed the dots on the wings with grass stems and cellulose paint. This seems best for flying insects as it is light, dries quickly and does not visibly hamper flight. However, it may well eventually wear off (especially on other orders of insects such as Orthoptera) and so is possibly not ideal for a long survey.

Table 1 Capture/recapture data for *Ischnura pumilia*  
Date—July

Number of Insect	6	7	8	9	10	11	12
1	x						
2	x	x		x			
3	x						
4	x	x					
5	x	x			x		x
6	x						
7	x			x		x	
8	x						
9	x						
10	x						
11		x		x			
12		x					
13		x					
14		x	x		x		
15		x					
16		x	x				
17		x					
18		x					
19		x					
20			x				
21			x				
22			x				
23			x				
24				x			
25				x			
26				x		x	
27				x			
28				x			
29				x			x
30					x		
31					x		x
32						x	
33						x	
34						x	
35						x	
36						x	
(37)						(x)	
38							x
39							x
40							x
41							x

(N.B.—x denotes the capture or recapture of an individual. Thus, insect number two was captured on 6th, recaptured on 7th and last captured on 9th July. The insect in brackets died before its release.)

### Analysis of data

The data can be analysed by many methods ranging in simplicity from the most basic Lincoln Index to the more complex method of Fisher and Ford. Most of the methods are based on the simple Lincoln Index which assumes that if a sample of  $S_1$  specimens is caught, marked and released so that they remix at random through the population, and



then a second sample of  $S_2$  specimens is captured and contains  $M$  marked individuals the population  $P$  can be estimated by: —

$$P = \frac{S_1 \cdot S_2}{M}$$

This method is most suitable for situations where there are neither gains nor losses in the population, although it can be modified to work for other situations.

Various other methods of analysis are in wide use but they are too complicated to explain in a few lines. (See Parr, 1965; Parr, Gaskell & George, 1968.) Of these other methods the Jolly (1965) and Fisher & Ford (1947) were used in this study. The number of insects captured, released and recaptured were inserted into a special table to simplify the calculations (table 1).

## Results

The Lincoln Index can only be used for estimates of the 7th and 8th of July, as there are no recaptures of the previous day's captures after the eighth. As there are few recaptures of the later insects caught, both Jackson's methods are extremely inaccurate and have therefore not been used in this study. However, results can be obtained from Jolly's and Fisher & Ford's methods.

<i>Ischnura pumilio</i> : Sample Sizes and Population Estimates				
	Sample Size	Lincoln Index	Jolly	Fisher & Ford
July 6	10	—	—	—
" 7	12	40.0	21.6	39.4
" 8	6	63.0	78.0	64.5
" 9	9	—	27.0	60.9
" 10	4	—	16.0	35.5
" 11	8	—	—	103.6
" 12	7	—	—	63.2

To use Fisher & Ford's method it is necessary to evaluate the Daily Survival Rate, this number is calculated from the observed days survived and the expected days survived (see Parr 1965). On this occasion the Daily Survival Rate was found to be 98.42 per cent; this is very high (far too high to be realistic as it suggests that the average length of life is 93.3 days, and as the flying season for a whole colony is only about ten weeks this is impossible). It is inaccurate because of low numbers captured and recaptured.

## Conclusion

All the methods show an increase on the eighth, and then a drop on the ninth (the difference in drops demonstrates the weakness of the evidence: Jolly's alters by over 60%, Fisher & Ford's by only a few per cent). There are several such inaccuracies (mainly due to low recapture figures) and hence it is difficult to draw any definite conclusions. However, there seemed to be over fifty males in this one colony, which could be considered fairly safe as it was in a very remote area. Also

several of the other colonies were in even remoter areas, and one could only be reached in dry weather. In fact *Ischnura pumilio* may not be as scarce in the Forest as most people think; it could just be that it is well hidden and at a glance, easily confused with *Ischnura elegans*. In the remote parts of the Forest we had no difficulty finding *Ischnura pumilio* even in unlikely habitats.

As this survey was not as successful as we had hoped it is our intention to conduct another survey next year when if better weather prevails, the results should be more reliable and more concrete conclusions drawn about the colony size, wind distribution and rarity of *Ischnura pumilio*.

23.10.68

John G. Dapling (3600J).

G. Rocker (4007J).

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[The above is the winning entry for the 1968 Junior Conservation Prize.]

#### COLEOPTERA AT AN M.V. TRAP

Large numbers of beetles are regularly attracted to my M.V. trap, and on some nights the bottom is almost entirely covered by the blackish-brown dung beetle *Aphodius rufipes* Linn. This year I decided to identify the other species, and I found eight in all. A typical record for two nights may be of interest:

			20th July	23rd July (1968)
<i>Aphodius rufipes</i> Linn.	...	...	at least fifty	
<i>Necrophorus vespillo</i> Linn.	...	...	4	2
<i>Necrodes littoralis</i> Linn.	...	...	2	1
<i>Melolontha melolontha</i> Linn.	...	...	—	1
<i>Serica brunnea</i> Linn.	...	...	2	1
<i>Lagria hirta</i> Linn.	...	...	1	1
<i>Harpalus rufipes</i> De Geer	...	...	—	1
<i>Athous</i> sp.	...	...	—	1

This seems to be a fairly varied assortment, and I can see no relationship between these species. The cockchafer (*Melolontha melolontha* Linn.) is attracted quite often to moth traps, judging by



previous articles in the *Bulletin*. If large numbers are present in the vicinity of a trap, do many find their way into it? If they do, it must greatly reduce the quality of the catch, as they generally bumble around inside the trap for some time before settling down, and they are bulky insects!

Robin L. Hard (3629J).

## DISTRIBUTION OF FINNISH INSECTS—2: SPHINGIDAE

Since the publication of my notes on the distribution of Finnish butterflies (refs), I have received from several interested members letters requesting information on various aspects of Finnish insect life. I now propose to pass on some details concerning those species of moths about which something has fairly recently been published in Finland.

This article deals principally with those hawkmoths which are resident in the country, and I have taken the opportunity of combining with previously published material first-hand information gathered by myself in 1967 and by my wife and myself in 1968. The abbreviations used to denote distribution will be found to refer to the natural historical areas recorded on a previous map (*Bull. amat. Ent. Soc.*, **26**: 120).

*Acherontia atropos* Linn.

Deaths Head Hawkmoth

Has been recorded from all Finnish 'counties'. Grönblom (Tampere Entomological Society) records that the species has been noted nine times in Pirkanmaa, near Tampere (61° 50' N., 23° 45' E.). He gives (1967) the total number of specimens recorded in Finland as 370. The biology of the species in Finland appears to be the same as in Britain.

*Herse convolvuli* Linn.

Convolvulus Hawkmoth

Occasionally occurs in fair numbers, though is usually rarer than the preceding species. Occurs, like the previous species, in autumn. A-SK, SH-SO, NS, MO, KemL. Recorded six times in the Tampere district (Grönblom).

*Sphinx ligustri* Linn.

Privet Hawkmoth

Gardens and meadows. Fairly common, June-July. A-LK, NH-NK, Kn.

*Hyloicus pinastri* Linn.

Pine Hawkmoth

In and around pine forests; often in gardens, where it visits, e.g. Lilac (*Syringa* sp.), Honeysuckle (*Lonicera* sp.) flowers, as does the preceding species. Common, June-July. A-KemL.

*Dilina tiliae* Linn.

Lime Hawkmoth

Gardens and Parks. Fairly rare, June-July. A-LK, NS.

*Smerinthus ocellatus* Linn.

Eyed Hawkmoth

Fairly common, June-July. Flies at night, but does not visit flowers. A-MO, NO.

*Laothoe populi*, Linn.

Poplar Hawkmoth

Common June-July. Nocturnal, though does not visit flowers.

*L. tremulae* F deW.                      Aspen Hawkmoth  
(Forewings without white dot; hindwings lacking ruddy colouration of *L. populi*). Especially on beaches; rare, though commoner in the east, June-July. V-NK, Kn. Larva green, rougher to the touch than that of *L. populi*; horn longish, bluish especially at the base. Foodplant: *Populus tremula* Linn. Not found in Norway, Sweden, or Denmark.  
*Hemaris (Haemorrhagia) tityus* Linn.  
Meadows and gardens. Fairly rare, May-July. Diurnal; visits flowers. A-Kn.

*H. fuciformis* Linn.                      Honeysuckle Hawkmoth  
Fairly rare, June-July. Diurnal; visits flowers. A-MO, NO.  
*Macroglossum stellatarum* Linn.                      Humming Bird Hawkmoth  
Really a south European species; very rare, May-June and Aug.-Sept. Diurnal. Sometimes hibernates. A-LK, NH-NK.

*Daphnis nerii* Linn.                      Oleander Hawkmoth  
Sometimes arrives from southern Europe. Noted a few times July-Sept. A-SK, St, LK. Larva has not been found in Finland.

*Celerio galii* Schiff.                      Bedstraw Hawkmoth  
Gardens and meadows; fairly common, June-Aug. Flies at dusk, sometimes by day, and visits flowers. A-InL. Larva eats *Galium* spp., *Chamaenerion angustifolium* Scop. (Willowherb), etc.

*C. euphorbiae* Linn.                      Spurge Hawkmoth  
Has been found a few times, Aug.-Sept. V, U, St, LK. Absent from Norway. Larva has never been found in Finland.

*C. lineata livornica* Esp.  
Not known from either Finland or Norway.

*Hippotion celerio* Linn.  
Found a couple of times in Denmark.

*Pergesa elpenor* Linn.                      Elephant Hawkmoth  
Flies at dusk and visits flowers of bushes. Common, June-July. A-NO.

*P. porcellus* Linn.                      Small Elephant Hawkmoth  
As preceding species. A-NK.

On July 12th, 1967, searching the sallow bushes growing in an old quarry twenty kilometres west of Tampere resulted in the capture of a number of larvae and the discovery of ova—one larva and seven ova (black) of, I believe, *Notodonta ziczac* Linn., two larvae, five unhatched ova and four empty egg-shells of *Dicranura vinula* Linn., and two ova of *S. ocellatus*. The latter produced larvae which unfortunately succumbed during extremely hot, dry weather on the trip north to Kuusamo at the beginning of August. I revisited the quarry on August 20th, discovering a single *S. ocellatus* larva on a small, glabrous-leaved willow bush (*Salix* sp.). This eventually pupated, and at the time of writing (October 3rd, 1968) is still a healthy pupa.

In that year also an unidentified sphingid pupa was accidentally dug up by my wife during a worm-hunt on August 26th. This was (and still is) probably either *Smerinthus* or *Laothoe*.

On August 27th, arriving home late at night, my front door key

safely tucked away in the upstairs bedroom, not wishing to disturb the old man with whom I lodged, I drove out into the forest and spent an uncomfortable night in my car. At ten a.m., by which time, I judged, my dear old friend should have been well on the way to recovery from an excess of *sauna* and *koskenkorva* spirit, I returned to the front door, only to discover it still securely bolted. It was raining devotedly and I was cold and miserable. I directed a distasteful gaze at the lilac tree growing right outside my only means of entry. There, less than a foot away from my face, sat an equally lugubrious-looking *Sphinx ligustri* caterpillar, front half raised off the twig, bright torso beaded with rain-drops. A frenzied search of the lilac produced a second specimen. I felt it to be to our mutual advantage to pound on the door and gain admittance for all of us. My poor host, eyes still brim-full of sleep and other things, must have thought me a raving lunatic as he glassily gazed from my bedraggled hair to the monster caterpillars rearing one from each hand. However, the larvae liked our indoors so well that they decided to pupate a few days later, and have refused to budge from their snug chitinous caskets ever since. Perhaps a spell in the refrigerator would have shaken them up a bit.

That was in 1967. Before the year was out I acquired a wife who, though she was quite willing to have my pupae in the fridge, kept the latter so well stocked that there simply wasn't room for anything inedible. I forgot about artificial winters and concentrated on avoiding the real one.

We began our 1968 summer holidays on June 16th, at a village known as Virojoki, in South-Karjala some ten kilometres from the eastern border. The dusk around midsummer in the south of Finland is a prolonged affair which, after the hot, dryness of the day, instills the land with its own special brand of romance. Whilst poaching pike in this late dusk I saw my first Elephant Hawkmoth come buzzing down to the lakeside to hover there for a second or two. In the diffuse light it was difficult to make things out clearly, but I was almost sure I spotted another one a little later on, and certainly some moth the size and shape of one of the larger hawkmoths came skimming over, high up above, silhouetted against the sky. On the evening of August 2nd I found an almost fully-grown larva of *P. elpenor*, in almost the same spot (if not the very same) where I had observed the first adult *P. elpenor*. This was feeding on *Menyanthes trifoliata* Linn., which astonished both myself and a Finnish entomologist to whom I showed the caterpillar and its half-eaten food.

I spent several evenings (June 17th–20th) myself hovering around the flowering lilac bushes in the garden. Here I saw a total of four *P. elpenor*, three *H. pinastri*, one *P. porcellus* and another unidentified specimen. These were only active from early dusk (about 11 p.m.) until 1 a.m., when it was already light enough to read the *Bulletin* out-of-doors. I took one more *H. pinastri* near the seashore, as the moth zoomed over a barn in front of a lilac bush. This was at 10.30 p.m., when



the light was only just beginning to fade. Generally it was the white-flowering lilacs which were visited, though I did take both *P. elpenor* and the *P. porcellus* at the purple-flowered variety.

My final encounter with the adult *P. elpenor* occurred on the evening of July 31st. I was searching willowherb beds at the time for its larvae (and had already acquired a few in their final instar), when a large pinkish moth suddenly bumbled up from the leaves. I succeeded in knocking it down with a hand, but it rose quickly and sped away into the developing dusk. By July 22nd I had acquired an Airam light bulb, 100 watt, and used to screw this into an anglepoise socket, directing the beam downwards on to a white sheet outside the open window. I had varying degrees of success, but the cold night of August 2nd brought in only one specimen—a *P. elpenor* with a badly rubbed left forewing. The light was situated only about 100 metres from the spot where I had assaulted the specimen on July 31st. Was it, I wonder, the same individual? After being released, it certainly didn't come again!

June 23rd found us in the environs of Oulujärvi, the large lake in central Finland. We camped in a disused sand-quarry and were able to watch in the semi-dusk several different kinds of moths flitting and swooping about their business. Of these, it was a female *H. pinastri* which stole the show. She was first sighted as she zoomed high over the quarry to dart among the topmost twigs of a pine grove. Here she sped from branch to branch for several minutes, before turning suddenly to plane away over the copses into the already lightening sky. This mere dimming of the daylight instead of real darkness gives one the chance of discovering that the 'now you see me, now you don't' method of flight of the diurnal hawks such as *M. stellatarum* is a conjuring trick of their nocturnal relatives too. When one sees them one is apt, perhaps, to become a little less scientific and a little more of a reveller in the sheer beauty of natural effects.

Hawkmoth larva-hunting commenced in earnest after I accidentally discovered the green, black, yellow and red caterpillar of *Celerio galii*, feeding on Willowherb along an otherwise unproductive railway track, on July 27th. Seven were actually collected from that place, the bright colours of the fully-grown larvae against their background of willowherb leaves, and the habit the larvae had of coming up the stems in the early evening, rendering them visible from several yards distant. The younger larvae, pale green, yellow-spotted (most of the larger ones had reddish or orangey spots) were rather better camouflaged. Later we practically became plagued by the species. We found them at the roadsides, we found them in spruce groves on bunches of willowherb, we picked them up as they wandered across a tarmac highway, we even acquired two as the result of a short trip back to Tampere. All of them were feeding on willowherb, and they ate voraciously, squirming about in their muslin-topped shoe-box among pounds of food that always looked like a miniature dinosaur fossil the next morning. I began to look upon them as my silk-worms, as they shifted restlessly about their box each night

and became fat as barrels on the food they put away. Just before we left for England I removed seventeen pupae from their hairnets of cocoons. This does not seem a very high total, but when you consider that the last eleven came from half-a-dozen places, you will appreciate that the species is quite common in the south of Finland.

Several *P. elpenor* larvae were discovered as we obtained our *C. galii* caterpillars, but we didn't try to obtain any *H. pinastri* larvae. I honestly think one would go mad if one went in for searching pine trees in Finland!

There is just one final story on the subject of *H. pinastri*. Whilst fighting my way through an entanglement of mature Spruce (*Picea* sp.) in mid-July I came upon a dried female specimen hanging by a foreleg from the trunk of a tree. Why it should have died there is a matter I am still pondering on, for it was perfect apart from a slight rent in one forewing.

In the meanwhile, I shall pass on details of whatever appears from my pupae—provided, that is, they emerge before we all pass away!

4.10.68

Leigh Plester (2968).

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### XYLOTRUPES GIDEON LINN

These drawings were made from specimens given to me by Mr K. Dansie of Broken Hill, N.S.W. Both male and female are entirely black, with rather sparse golden pubescence on the underside. The male is very smooth, looking as if it is made of plastic, while the female has the thorax and elytra covered with small punctures.

Mr Dansie sent me the following information about the beetle:

'These beetles are found in the summer months from northern New South Wales to northern Queensland. The large curly grubs breed in cane-sugar sediment presses in sugar mills, also in compost heaps.

'The larvae have been reported as attacking roots of sugar-cane and breeding in the heaps of megass around the mills.

'The following report was given to W. W. Froggatt by a plantation manager:—

"Whilst walking past a small Red Cedar tree (*Cedrela toona*) I happened to look up and saw a couple of dozen elephant beetles on a branch about three inches in diameter. I climbed up and found they were tearing off the bark. After collecting the beetles I found the bark torn off as if it had been hacked

*Xylotrupes gideon*  
(Linn)



with a blunt saw, large particles of bark had been entirely torn or chewed off the upper surface."

Adult beetles have also been reported as attacking Jackaranda trees. 'Another author says "Larvae breed in decaying vegetable matter from which adult beetles emerge and climb up the first tree to hand on which they cling during the day but come buzzing around the lamps during the night."

'I do not know how much credence should be placed on the report that the larvae attack sugar-cane roots, there seems to be only one reference to this and there are a number of similar larvae. However closely related species Dynastinae are pests, larvae of which damage the roots of various plants.'

I would like to take this opportunity to thank Mr Dansie for supplying the information and giving me the specimens illustrated.

12.10.68

Jonathan Cooter



## BEETLES OF SPEYSIDE

Thirty miles south of Inverness in the shadow of the Cairngorm Mountains is the town of Aviemore. The town is a convenient centre from which to study the varied natural history of the Spey Valley. During the summer of 1968 I spent a week in this area, and although there were only two really sunny days, several interesting species of beetles were found.

Some of the few remaining areas of old Caledonian Pine forest are to be found in the Spey Valley, and many of the beetles of the region are associated with these fine old trees.

Collecting was concentrated in two main areas. By far the most important of these was an area of newly felled Scots Pine (*Pinus sylvestris* Linn.) near Feshie Bridge. The other locality was the forest area near Loch Garten.

**Feshie Bridge Area**

When I visited the Spey Valley in June, 1965, this was a very productive locality, but a second visit in September, 1966, was rather disappointing. When I searched the area a third time in 1968 it had regained its old glory.

The evening of the 29th June was fine and about half an hour was spent searching the freshly cut pine logs.

The weevils *Hylobius abietis* Linn. and *Pissodes pini* Linn. were both present in large numbers. In June, 1965, *P. pini* was by far the most numerous, but in 1968 both species were equally common. The highlight of this short search was a perfect female specimen of *Acanthocinus aedilis* Linn., the Timberman beetle.

The 30th June was quite warm although there was very little sunshine. An early morning search produced a number of interesting beetles. *H. abietis* and *P. pini* were again very much in evidence, and another specimen of *A. aedilis* a male was found on the same log as the one on the previous day. Two further species of cerambycid also occurred, *Rhagium bifasciatum* Fab. and a single *Rhagium indagator* Fab. Other species found included several specimens of the Ant beetle, *Thanasimus formicarius* Linn.

The timber pile was again visited on the fine sunny evening of the 1st July. Two examples of the rather local click beetle *Campylus linearis* Linn. were found and shortly afterwards a perfect specimen of the rare *Pytho depressus* Linn. This beetle was found on the bark of a freshly felled pine tree; the only other example of this species that I have found was under the bark of a rotten log near Loch Garten in September, 1966. The discovery of *P. depressus* was the first of several other interesting finds. My wife, who was collecting with me found a number of specimens of *Thanasimus formicarius* Linn., *Glischrochilus quadripunctatus* Linn. and a couple of *Asemum striatum* Linn. Meanwhile I had found a single *Dendrophagus crenatus* (Payk) and the best beetle of the day, *Judolia*

Table 1

Species	June 1965	September 1966	July 1968
<i>Staphylinus erythropterus</i>	—	—	one Loch Garten
<i>Cicindela campestris</i>	few near Coylumbridge	—	Loch an Eilean common
<i>Selatosomus impressus</i>	three in Glen Feshie	—	few Loch Garten
<i>Campylus linearis</i>	—	—	two at Feshie Bridge
<i>Rhagum bifasciatum</i>	common in Glen Feshie	few in Rothiemurchus	odd ones at Feshie Bridge and Loch Garten
<i>R. mordax</i>	—	one Loch an Eilean	—
<i>R. indagator</i>	one Feshie Bridge	many loch Garten	one Feshie Bridge
<i>Pogonocherus</i> <i>fasciculatus</i>	—	—	one Loch Garten
<i>Asemum striatum</i>	—	—	several Feshie Bridge and Loch Garten
<i>Judolia sexmaculata</i>	—	—	one Feshie Bridge
<i>Acanthocinus aedilis</i>	—	—	two Feshie Bridge
<i>Pissodes pini</i>	common	one Feshie Bridge	common
<i>Hylobius abietis</i>	few Feshie Bridge	—	common
<i>Thanasimus formicarius</i>	one Feshie Bridge	—	four Feshie Bridge
<i>Dendropagus crenatus</i>	—	five Loch Garten	one Feshie Bridge
<i>Pytho depressus</i>	—	one Loch Garten	one Feshie Bridge

*sexmaculata* (Linn.). The insect was first seen in flight, and then landed on the path in front of me. It is a rare species restricted to pine woods in the north.

### Loch Garten

This locality did not produce as many beetles as the one in Glen Feshie, but some interesting species were found.

The area worked consisted of old standing pine trees and a region of cut branches left over from recent timber felling operations. *H. abietis* and *P. pini* were again present in fairly large numbers. A few specimens of the click beetle *Selatosomus impressus* Fab. were also found. Three species of longhorn occurred in this area. Several *Rhagum bifasciatum* were found in old logs, a single *Asemum striatum* on a fresh pine stump and one *Pogonocherus fasciculatus* Deg. The latter species is quite rare but has been found previously in this area by Mr J. Cooter. Of the commoner beetles *Phosphuga atrata* Linn., *Carabus problematicus* Herb., and *Geotrupes stercorosus* Scriba were found.

Two further localities were visited, Loch an Eilean, and the upper part of Glen Feshie. The forest track was followed around Loch an Eilean on the 1st July. *Cicindela campestris* Linn. was very common. Many of these beetles were seen running on the path or flying in the warm sunshine. They were mainly in ones and twos but in very sunny spots six or more were found together.

The higher ground of Glen Feshie was rather disappointing. *Nebria brevicolis* Fab. were present in some numbers and a few *Feronia madida* Fab. but nothing much else.

In the last four years I have visited the Spey Valley on three occasions. The more local beetles found on these visits are summarised in table 1.

The longhorn *Rhagium indagator* was recorded on each visit and in September, 1966, I found far more of this species than *Rhagium bifasciatum*. Mr J. Cooter also records *R. indagator* from Loch Garten. It appears, therefore, that the beetle is rather more numerous, in the Spey Valley at least, than the text-books would have us believe.

Most of the beetles that were associated with pine trees were found on freshly felled timber. Logs that appeared to have been cut for a long time and naturally fallen trees had considerably fewer beetles.

I would like to thank Mr C. Simms of the Yorkshire Museum, York for allowing me to check the identity of certain beetles against those in the museum's collection, and also my wife Hazel for helping with the search for specimens.

17.11.68

J. K. Smith (3795).

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#### YUGOSLAVIA 1968

This year I travelled across the Continent to Yugoslavia where I spent my summer holidays with my parents at a hotel in Bol, on the island of Brac.

The island proved to have a great deal of insect life despite the fact that the authorities regularly spray the beach and streets with DDT. The main vegetation was a shrub which grew all over the ground. There were also some pine forests and springs. The cultivated areas were extensive grape plantations and patches of tomatoes, pumpkins and other vegetables; fruit trees, mainly fig and almond, were plentiful.

We had supper in a big dining room covered by a concrete roof lit by fluorescent lighting. The sides of the room were open and so moths were attracted, all of which were *Convolvulus* Hawkmoths (*Herse convolvuli* Linn.). The absence of the many smaller species was probably due to the regular DDT spraying. One night I noticed an object clinging



to a wall, which on closer inspection turned out to be a Striped Hawk-moth (*Celerio livornica* Esp.).

At lunch time and in the evening I went on the ground in front of the hotel, which was covered by fig trees, other low bushes and sub-tropical thorns, to look for butterflies. *Papilio podalirius* Linn. (Scarce Swallowtail) was very common, as was *Satyrus briseus* and various members of the 'Blues' and 'Whites'.

One day when the weather was not good we went inland to the high ground (about 1,500 ft.) in the centre of the island. Here there was a number of water reservoirs and the shrub included a lot of blackberry bushes with very good and ripe fruit. On the way there and back I came across various butterflies. Amongst the more interesting were *Argynnis paphia* Linn. (Silver-washed Fritillary), *Plebejus argus* Linn. (Silver-studded Blue), *Pontia daplidice* Linn. (Bath White), and *Colias croceus* Fourcr. (Clouded Yellow). These were seen in large numbers, together with the more common species, so this would seem a good place for a butterfly farm!

Around the hotel there were lots of pine trees which surrounded the place and on one tree I found twenty-seven eggs of *Hyloicus pinastri* Linn. (Pine Hawkmoth) of which I tried to hatch four without much success.

9.11.68

L. S. Anderson (4121J).

## FIELD MEETINGS 1968

A number of field meetings were arranged during 1968 several of which were organised jointly with the British Section of the Teen International Entomological Group.

Our first meeting was held in Epping Forest on April 7th. Six members met outside the Forest Museum at Chingford and spent the day in the Forest. Unfortunately the weather was against us and remained dull and cloudy. Attempts at pupa digging around some poplars were none too successful but a number of beetles were found. Several interesting flies were taken during the course of the day. Later in April a meeting was led to Bookham Common in Surrey by Mike Wilson.

A meeting at Earls Hill Nature Reserve (Shropshire) was planned by Paul Evans, but the note in the Wants and Exchanges list brought little response from members. The local field station were going to co-operate and show members sites of special interest within the reserve. Perhaps, with more response from members, this meeting could be arranged during the next season (1969).

South Ockendon, Essex was to have been our destination in June. This was a locality with several large ponds. These and the surrounding

countryside would have interested many members—had they attended the meeting.

July saw a more successful meeting at Northaw Great Wood in Hertfordshire. The weather was sunny and hot and the four members who attended had a very enjoyable day and some interesting catches. Paul Lorrimore led this meeting which was one of the best of the season.

Meetings were also held in Shoreham, Kent led by P. Hawkey and Tony Steele. It is of interest to note that all the above meetings were led and attended by our younger members. Space was given in the Wants and Exchanges list for details of meetings of other societies at which our members would be welcome. I hope some of our members were able to attend these meetings.

Ron Allen.



### FIELD MEETINGS, 1969

As Field Meetings Secretary I should like to arrange a programme of field meetings for the 1969 season. Will those members who think that they may be able to lead meetings or organise meetings jointly with their local natural history societies please let me know. Most members have areas which they know well, to which they could take a small party of fellow members. Please write to me if you need any advice about leading such meetings. I should also like suggestions for localities in which to hold meetings.

That our 1968 meetings were arranged and led by our younger members is a good sign of enthusiasm; but the majority of our membership are full members. Please, will some of our senior members do us the honour of leading some field meetings?

Finally, I ask all members to support our field meetings, and those of their local society or naturalists' trust, by attending and taking an active part in as many as possible.

Unless otherwise indicated in the meetings notice please bring a packed lunch to all meetings.

Ron Allen.

26 Burnside Road, Dagenham, Essex.



### LETTER TO THE EDITOR

Sir,

My attention has been drawn to your Editorial in No. 280 of the *Bulletin* (August, 1968).

When the Botanical Society of the British Isles (BSBI) began its

mapping scheme in 1950 there was no Irish Grid and it is only very recently that the Irish Grid has appeared on maps. It was not as you suggest a foolish invention of the BSBI but under the circumstances an unfortunate necessity that it had to extend the British National Grid to cover Ireland. The Biological Records Centre (BRC) has continued to use this extension rather than lose all the records made during the period that there was no Irish Grid.

The BRC can only be fully effective with the co-operation of societies such as the AES and the BSBI and for this reason is calling a conference of recording societies in Cambridge on October 5th and 6th when among other matters the future of recording in Ireland will be considered. You will, I am sure, agree that whatever we do as recording societies we should reach some agreement to record on the same basis.

Yours sincerely,

John G. Dony,  
President, Botanical Society  
of the British Isles.

## BIOLOGICAL RECORDING AND SURVEYS

A meeting of the National Biological Societies organised by the Biological Records Centre, was held on October 5th and 6th to discuss the problems and progress of the many biological recording schemes now in operation. I attended this meeting as AES representative, but what follows is not a full account of the meeting but only a discussion of the points likely to be of interest to AES members. Since the meeting was a discussion and not a decision making meeting, I have not hesitated to add my own points of view.

The future of the vice-county system was discussed. This originated as a botanical unit of recording but because of the awkward and variable sizes of the vice-counties their replacement by 50km grid-squares was considered. There was some confusion (not completely cleared up during the discussion) concerning an area which is to be a mapping unit and an area in which recording is done. The latter should be some logical, geographic area; i.e. continent, country, county or vice-county. The mapping units, however, should be unit-areas of the same size and shape. For this purpose grid-squares of the appropriate size should be used.

A scheme for the BRC to acquire and store information about rare species was described by Dr Perring. This information could help bodies choosing areas as nature reserves—the BRC computer quickly providing lists of important species for any given area. Obviously there would be safeguards about disclosure of confidential information, but even so it seems unlikely that many naturalists will disclose their secrets to the BRC.



Policy on introductions produced a conflict of interest. Those interested in migration and natural changes of range were against all introduction and felt that introductions which could not be prevented should at least be recorded. The more practically minded considered that it was a waste of time to try and record introductions since most would escape the recording procedure. Small introductions of surplus stock would rarely be dangerous and even more rarely assist in conservation. Carefully planned introductions into nature reserves of species which occur in surrounding areas or which once occurred there, has much to recommend it.

Much to the satisfaction of your representative the BRC seems to be changing its attitude to the Irish National Grid. Future surveys will record Irish records on the Irish Grid. The position regarding the current surveys (e.g. the Lepidoptera mapping scheme) is not yet clear. The best policy is for recorders to give the full six-figure grid reference for all Irish records using whichever grid they find convenient. If the full grid reference is given then it is possible to convert from one grid to the other.

A full duplicated report of this meeting, prepared by the BRC, is available on loan to interested members of the AES. If you wish to see the report please write to me enclosing an SAE.

D. Corke (2962).



## JUNIOR NEWS SECTION

Greetings, larvae! From the amount of news I have received recently I think you must all be in your hibernacula. Several of you did hint during the summer that you had managed to develop various pieces of equipment: light traps, carrying boxes, nets and the like, very cheaply. Now is the time for you to be generous and to share your clever ideas with us all, so that we can while away the winter months putting them into practise.

M. J. Sweeney (4013J) hopes these odd notes on his observations of the Large Elephant Hawkmoth caterpillars (*Deilephila elpenor* Linn.) may stimulate some interest in these fascinating animals.

He found his first larva while walking across Stanmore Common in Middlesex. It was resting on some Rosebay Willowherb (*Chamaenerion angustifolium* Linn.) in the characteristic, menacing, defence position, with its head drawn back and the 'eye-spots' enlarged. Since the larva was brown M. J. thought it was ready to pupate, so he put some sprigs of Rosebay Willow-herb in a plastic breeding cage provided with suitable pupating material. He was rewarded a few days later when he found the one and a half inch long, patchy coloured pupa amongst the leaves and moss. He thought it remarkable that the pupa was so rough to touch.

Fired with his first success M. J. kept a watch out for further specimens and, in late August and early September, he did manage to turn up eight more from Aldenham, Ruislip Lido and Ruislip Common. They were all close to pupation and three did in fact form chrysalids on September 14th.

The remaining larvae were not so lucky and were heavily infested with fat whitish-grey parasitic grubs about one cm long. These pupated two days after leaving their hosts; leaving M. J. with five limp larval skins.

The two male and two female pupae seem healthy and their emergence next spring is anxiously awaited. M. J. hopes to breed from them and to release the offspring the following year. He thinks it may be of interest that all the caterpillars were found near water.

Last autumn's AES annual exhibition was rather a disappointment. There were more people, possibly, than ever before but very little to look at. The traders, in some cases, had better displays than the exhibitors and the AES council found it very difficult to find anyone to give the junior prize to. I am afraid that members were too busy buying and selling. Even my own crowd from St. Ivo School had not done much to alter the display since last year.

Barbara Brant (3893J), who has been working on the Hawk-moths has found another absorbing group to study—the Saturnidae (Silkmoths). Barbara says that she enjoyed the AES exhibition. She bought some Asiatic Silkmoths (*Philosamia cynthia ricini* Boisduval) pupae which emerged, mated and laid eggs; and some caterpillars of the Brazilian Golden Bulls' Eye (*Automeris aurantiaca* Weymer) and the Indian Moon Moth (*Actias selene* Hübner) all of which are growing well. Be careful!—the *Automeris* caterpillars have poisonous spines. Put on a display next year, please, Barbara.

St Ivo Entomology and Natural History Society is hoping to make one of their habitual forays into the New Forest next summer, staying in Youth Hostels and hiking from place to place. We also hope to raid the Isle of Wight for just a few of the chalk butterflies and the Romney Marshes for some nature's comics—the laughing Marsh Frogs (*Rana ridibunda*). Are you off anywhere interesting next summer?

If you have any money left over after Christmas you might like to buy your younger brother or sister either one (or both) of Mario Faustinelli's 'Private Lives of Animals' edited by that well-known authority on natural history, John Clegg. Each book deals with the lives and interesting behaviour of a number of animals including insects, all beautifully drawn in glorious colours. Book One deals with animals of the house and garden and Book Two with those of the field and farm. Price 22/6 each, published by Warne.

Do you remember me asking you to look out for the little Gum Spitting Spider *Scytodes thoracica*, the one which stalks its prey on walls and holds down its prey with sticky fluid fired from its head? Well, I found some. They were in the coal hole of a Youth Hostel in Mitchel-

dean, Gloucestershire, during the summer. They're quite small so you will have to look closely to find them.

One spider which should not be so hard to see is the Great Banded Orb Web Spinner *Argiope bruennichi*. Do you know of anywhere they can still be found in Southern England? I really would like to know.

Southern England has always been over prominent in the organised functions of national natural history societies so the Association of School Natural History Societies' special weekend at Leeds University this July should make a refreshing change. It is hoped that many young and not so young naturalists will be able to involve themselves in the meetings and exhibitions.

Please let me know if you would like any stick-insects—I have four species doing well. All the best for 1969.

H. J. Berman (2491A).



## BOOK REVIEW

**The Oxford Book of Insects**, by John Burton. Illustrated by Joyce Bee, Derek Whitely and Peter Parks, pp 208 including 91 pages of colour illustrations. Oxford University Press, price £2 10s. 0d.

This book attempts to provide a means of approximate identification for all the British insects and on the whole it succeeds. Using this book anyone should be able to place an insect in its correct order and in the case of the larger orders take the identification further.

Presumably the publishers felt that without giving a disproportionate amount of space to the Lepidoptera the book would not sell. Nearly all the Butterflies are included (even the Large Copper, *Lycaena dispar* Haw.) and about 200 of the macro-moths plus three useful pages of 'micros'. Most naturalists will have other books for identification of Lepidoptera and so this section could have been reduced in size.

The illustrations vary somewhat in quality. Those drawn by Peter Parks are identified by a curious 'bug' in the corner of each plate which at first I thought was meant to indicate the scale of the drawing. Many of Parks' drawings are unnecessarily small, whereas Derek Whitely's are drawn to a good, large scale and are the best in the book.

The notes which accompany the illustrations are concise and useful, often mentioning other, similar species. Latin names are used on the plates except for the Lepidoptera. In the text both English and Latin names are given (except where no English name exists).

The classification given at the end of the book is somewhat dated as is the bibliography where many of the prices quoted were out of date when the book was published.



The colour reproduction is good with no signs of the colour fringing which mars many books of insect illustrations. In general this is a useful book which does what it sets out to do. It would be of most use to general naturalists rather than specialist entomologists—but even specialists might like to own a book which covers the orders in which they are not expert.

D. C.



### A STRANGE THING

It was the dark night of May 19th, 1967. Midnight was creeping up on the south of Finland. Outside the wind moaned suggestively along the wooden eaves, and the sky, beyond the mist-licked double window-panes, was an undulating black fleece. I was lying in bed reading, as it happened, back copies of the *Bulletin*.

In the shadowy side of the room something began to stir.

Its awakening was heralded by an ominous scratching sound which succeeded in doing things to the hair at the base of my neck. I lay quietly, straining my ears.

The rat which had become a pancake on the Pispala highway the night before now, as a picture of its flattened pelt snook to mind, became as big as Shrove Tuesday. There was also the disturbing presence of a recently-collected cat's skull with bits of putrescent matter adhering to it. This likewise, I knew, lay somewhere in those disturbing shadows beyond the range of my lamp.

I decided to face the intruder. The nine-inch long steel blade of my Lappish hunting-knife gleamed in the poor light by means of which I was reading, as the weapon was eased from its leather sheath on the wooden wall.

Clad only in a pair of underpants, I shivered as I crept across the already cooling room.

I stopped by the wood-basket, knife raised ready to deal a death-blow, mind searching for anti-poltergeist incantations. Thus armed, I stood my ground for a minute or so, while the unholy scratchings continued unabated. Eventually, I summoned up enough courage to peer over the rim of the half-empty firewood receptacle. As I moved, the creature loomed over the rim to greet me. We sized each other up for a moment or two, then the *Necrophorus investigator* Zett., its antennae all of a quiver, beat a hasty retreat back to its skull.

Strange things beetles. Now I allow only Ghost Swift Moths to torment me in the forbidden hours.

1.10.68

Leigh Plester (2968).

## GUIDANCE FOR AUTHORS

All authors of articles for the *Bulletin* are requested to follow these guidelines. Very short notes, articles by junior members and solicited articles can be retyped by the editor, if necessary, but articles by adult members which do not follow these simple rules may be delayed until the editor has time to type them.

(1) All material should be type-written, double spaced, with wide margins on *one side only* of quarto or A4 size paper. Author's corrections to his typescript should be in pencil.

(2) The title should be in capital letters throughout and must not be underlined. Please choose a title which will make reference easy when your article is indexed.

(3) The author's (authors') name(s) followed by AES membership number in parentheses, should be placed at the end of the article, on the right hand side, on a different line from the text, and not underlined.

(4) All living organisms, where exactly identified and relevant to the article, should be given their full scientific name. (Only if the article is of literary rather than scientific interest should mention be made of irrelevant, unidentified organisms.) The full scientific name consists of the name of the genus and species followed by the name of the author. The generic name has a capital initial letter and the specific name a small initial letter, both names must be underlined. The name of the author may be abbreviated if well known but single letter abbreviations are not used.

(5) If you wish well known English names may be used in addition to the scientific names. Either of the following forms is permitted: '*Pieris brassicae* Linn. (Large White Butterfly)' or 'The Large White Butterfly (*Pieris brassicae* Linn.).' English names should have a capital initial letter for each word in the name. This does not apply if the name is used as an adjective e.g. 'yew hedge'.

(6) Once fully named an organism may be referred to by its English name alone or by its scientific name which may be abbreviated as in the following example: *P. brassicae*.

(7) If the name of a genus is used on its own it should be underlined and followed by 'sp.' (singular) or 'spp.' (plural). These abbreviations for species should not be underlined, e.g. *Pieris* sp.

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(9) Any published work which is mentioned in the article should be referred to only by author and date of publication. Either of the following forms is acceptable: 'Ford (1955) states that . . . ' or 'It has been found that . . . (Yarrow, 1955). All the references must be listed on a separate sheet at the end of your typescript. References should be listed alphabetically by author and should take the form exemplified below:

FORD, E. B. (1955). *Moths. New Naturalist Series*. Collins, London.

YARROW, I. H. H. (1955). Some ways of distinguishing between the two common wasps *Vespula germanica* Fab. and *Vespula vulgaris* Linn. *Entomologist*, 87: 5-9.

The names of journals should be abbreviated as in the World List of Scientific Periodicals.

(10) Numbers below fifty should be written in full, except when giving dimensions of apparatus, etc. Numbers above 51 should be given in arabic numerals.

(11) Measurements should be given in metric units. This does not apply to instructions for making apparatus where materials are normally sold in British sizes, nor to conversational use of distance, e.g. ' . . . a few miles down the road. . . '

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**EDITORIAL**

The second of a series of longer articles introducing the less familiar (but no less interesting) groups of insects appears in this issue: Dr Macan's article on Mayflies will I am sure stimulate more interest in these fascinating insects.

The Bardsey Bird and Field Observatory on Bardsey Island offers hostel type accommodation for naturalists who would like to study, or simply holiday, on the island. Much work has been done on the island's birds but there is still plenty to be done by the entomologists. Details can be obtained from Mrs R. A. L. Bond, Wensheda, Clapper Green, Hunton, Nr Maidstone, Kent.

At this year's Verrall Supper the Biological Records Centre announced a new recording scheme—for Grasshoppers. Potential recorders are invited to contact the BRC.

D. Corke (2962).



**COLLECTING NOTES—MAY 1969**

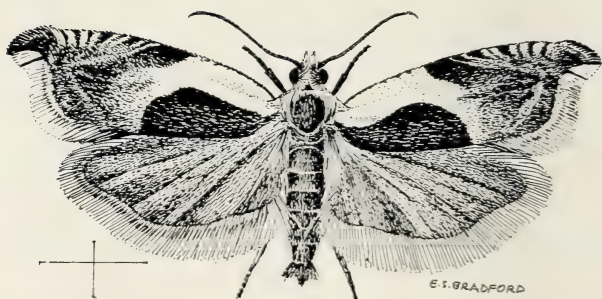
**The Smaller Moths**

The moths of the genus *Ancylis* are among the most attractive of the Olethreutidae. Mr E. S. Bradford has illustrated two of them. Of *Ancylis geminana* Don. he writes as follows:

'The specimen from which I made this drawing was one taken at Stoke Row, Oxfordshire, in May 1967. I have also taken it in Bricket Wood but have not bred it yet. The larva feeds on *Salix* spp. and, according to Ford, hibernates and pupates shortly before emergence. The forewings are brown-ochreous-grey, more whitish grey round the outer margin and tornal area. The costa and darker areas are reddish brown edged below with a whitish line. The hindwings are a lightish grey.'

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*Front cover illustration:* The dragonflies *Aeshna cyanea* Müll. (Anisoptera), *Libellula fulva* Müll. (Anisoptera) and *Coenagrion mercuriale* Charp. (Zygoptera), drawn by Mr G. Thomson (3689).

*Ancylys geminana* Don.*Ancylys badiana* Schiff.

There is still uncertainty regarding the number of species of *Ancylys* that feed on Sallow; five have been named. Meyrick and Bradley 'lump' them all together into a single species—*A. geminana* according to the latter and *A. diminutana* Haw. in the opinion of the former. Both Ford and Heslop give (with slight difference in synonymy) three species—*A. geminana* (*biarcuana* Steph.), *A. inortana* H.-S (*subarcuana* Dougl.) and *A. diminutana*. Bradley recognises the last two as forms but not as separate species. I feel fairly certain that *A. inornatana* at any rate is distinct because of differences in the foodplant and habits as well as in the markings of the imago. Last summer I collected *Ancylys* larvae in the west of Ireland from low scrub of Eared Sallow (*Salix aurita* Linn.) and Dwarf Sallow (*S. repens* Linn.) intermingled on the same hillside. I kept the larvae from the two foodplants separate, but accorded them the same treatment in other respects. Those feeding on *S. repens*



pupated in September and produced moths of the small, pale form known as *inornatana* in October, whereas those on *S. aurita* are still overwintering as larvae at the time at which I am writing this article. If I am successful in breeding the moths, I shall expect them to be of the larger, more strongly marked form which Mr Bradford has depicted or the one with the more gently waved central line which characterises *diminutana*. *A. inornatana* is the earliest to appear in the spring: I wonder whether it overwinters as a larva or a pupa in the state of nature.

Mr Bradford's second drawing is of *A. badiana* Schiff. and his note reads as follows:

'The drawing is from one I took in the garden where I have found the odd specimen now and again. One was on a sugared post late in the evening, but whether it had just happened to alight there or was attracted to the sugar I do not know. This moth was particularly numerous in a locality near home last year, but seeing that *Vicia* and *Lathyrus* (its foodplants) occur there it was not unexpected. The dorsal blotches on the forewings are dark fuscous and the light areas from the base are creamy ochreous. The costa is strigulated dark brown and whitish. The cilia at the tips of the forewings project beyond the curve of the wings. The hindwings are greyish. The moth is on the wing from May to August. I have always found this a fairly lively insect and have not yet got a good photograph of it.'

Undoubtedly *A. badiana* is the most widely distributed and plentiful species of the family. Its nearest relative is *A. paludana* Barr. which is confined to the fens of East Anglia; the larva feeds on *Lathyrus palustris* Linn. and the moth flies in June and August. Two species, *A. unguicella* Linn. and *A. uncana* Hübn., are heather-feeders (the latter also eats Birch, *Betula* sp.), and may be found on heaths and moorlands in May and June; the *Vaccinium*-feeding *A. myrtillana* Treits. favours similar terrain. *A. achatana* Sciff. is best obtained by beating the larvae or pupae from Hawthorn (*Crataegus* spp.) or Blackthorn (*Prunus spinosa* Linn.) in May. One of the most beautiful is *A. mitterbacheriana* Schiff. which should not be killed with ammonia or its red-brown hues will fade; Oak (*Quercus* spp.) is its normal foodplant but it may also feed on Beech (*Fagus sylvatica* Linn.) since I found a pupa last April in a shrivelled beech leaf still adhering to the parent sapling; there was no Oak in the vicinity. *A. upupana* Treits., soberly but tastefully clad, is a rare insect, but it may be found here and there flying rather high in the late afternoon sunshine of May or June round the Elms or Birches on which its larva has fed. On the other hand *A. comptana* Fröl. (less well turned-out in spite of its name) is a common and lowly moth, which can be found flying close over the downland herbage in May and again in August. *A. lactana* Fab. feeds on Aspen (*Populus tremula* Linn.) and sometimes other Poplars on whose trunks it likes resting in the late spring. Certainly the most local is *A. tineana* Hübn., which seems to be confined to the Rannock district in Perthshire. Three Buckthorn-feeders complete the list; these are *A. unculana* Haw. (*derasana* Hübn.),

*A. obtusana* Haw. and *A. apicella* Schiff. (*siculana* Hübn.). The first is confined to *Rhamnus catharticus* Linn., but the other two will also be found on *Frangula alnus* Mill.

All the moths I have mentioned fly during the months covered by this article and in some instances the larvae, too, may be found—attractive again, because they spin the leaves of their foodplant into pods in the neatest possible fashion. It is easier to breed this summer generation. The autumn larvae overwinter, generally in their pods, and only pupate shortly before the time of emergence. It is not difficult to get them safely through the winter, but they then fail to pupate. The best course is to keep the leaves containing larvae out of doors either in a flower-pot or in a nylon stocking thrown on the ground to simulate natural conditions.

A. M. Emmet (1379).

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#### Diptera: Syrphidae

Hover flies can be found in almost any location between March and August in the right weather conditions. Most species will not be found easily unless the sun is shining. Some localities are obviously better than others, and in my experience woodland is the best place of all, especially sunny clearings with plenty of flowers. Marshy areas, and also the plants growing beside rivers, will usually produce a good crop of Syrphids. In addition, there are a few species which will only be found on heathlands, and a few in mountainous areas, and also some of the rarer ones which only occur in a few specific localities, but these are not really for the beginner.

The insects will mainly be found hovering above or perched on flowers—yellow ones especially—or sunning themselves on broad, flat leaves. Some species will be seen in this situation more than others, especially *Syrphus vitripennis* (Meigen) and *S. ribesii* (Linn.). Bramble bushes, when in flower, will always produce a few hover flies, and in some localities will be swarming with them. It is interesting to note that the same bushes are usually swarming with other insects, especially Lepidoptera and Hymenoptera. In general it can be said that if you know a good locality for butterflies, you will also find hover flies there.

There are two main ways of catching the insects once you have found them, stalking and sweeping. Until some experience has been

gained stalking can be disappointing; on the other hand, sweeping will rarely produce the larger and more agile flies. I usually spend about two hours in a promising locality, the first hour or so stalking and then about half an hour or so sweeping, finally having a quick look round with the stalking net to see if anything new has arrived. Incidentally, I usually find that if I miss something when stalking, it will nearly always come back to the same place within about thirty minutes.

The time of day for collecting is not important, but a few points arise here: for instance, very little will be found before about 10 a.m. Between 10 a.m. and 12.30 p.m., and 2 p.m. and about 5 p.m. seem to be the best times. Between 12.30 p.m. and 2 p.m. there usually seems to be a decline in numbers, especially on a hot day. Perhaps this is a good thing, as it gives the collector a chance to eat the lunch he will have thoughtfully taken with him, or else to visit a public house in the vicinity. Also during this time, one can move on to a new locality. If the day is especially warm, as days in August sometimes are, collecting can often be continued until about 7 p.m.

Planning a collecting trip with the above information in mind may well produce the type of outing which my colleague David Pope and I partake of on several Sundays between April and September. We leave Bristol at about 9.15 a.m. and head West, arriving at our first locality, a woodland, at about 9.45 a.m., where we stay until about 11.30 a.m. We then move up into the Mendips, arriving at our favourite patch of marshy ground at about 12 noon. Best results are obtained here with sweeping, so we only stay for about half an hour. Between 12.30 p.m. and 2 p.m. we have our lunch and move to our next locality. Two places are usually visited in the afternoon, between about 2.30 p.m. and 4 p.m., and 4.30 p.m. and 6 p.m. We arrive back in Bristol at about 6.30 p.m., which gives us the evening in which to set our catch, and also argue about identification. A word of warning here, it is not easy to identify the majority of Syrphids whilst they are still on the setting boards.

There are a couple of things which should be mentioned here, which apply whatever you are collecting. Make sure you are not trespassing, and follow the Country Code.

Meanwhile, good hunting!

20.12.68

Alan J. Brown (3854).



## CONSERVATION—THE PURPLE EMPEROR

Members may be aware of the attempts in Oxfordshire to strengthen or re-establish the Purple Emperor (*Apatura iris* Linn.) in certain large oak woodlands. A basic necessity for the continuance of this species in Great Britain is the maintenance of large enough deciduous woodlands



carrying a sufficiency of mature trees and an undergrowth of Sallow (*Salix* spp.) in particular *Salix caprea* Linn., the Large-leafed Sallow. Our oak and beech woods of the Midlands and South have been the haunt of this butterfly through the ages but in the last fifty years the inroads made by the felling and planting of coniferous woodland has reduced the possible haunts to a very few. In Oxfordshire and North Buckinghamshire the policy of clear felling, dapple planting and latterly the killing of woodland by use of herbicides has had disastrous effects on the Purple Emperor and another woodland butterfly, the Black Hairstreak, *Strymon pruni* Linn. In Salcey Forest in Northamptonshire the use of chemical insecticides against Oak Tortrix Moth (*Tortrix viridana*) has had a devastating effect on both species and collecting has not helped the position. Some of the Wiltshire haunts have received protection and that County's Naturalist Trust has taken an interest in conserving suitable habitat for woodland butterflies, including the Purple Emperor. The status of the Purple Emperor in the New Forest is hazy as forestry has again upset so much of the suitable areas and some likely places are not open to the public. One of the well-known haunts was Alice Holt Forest in Hampshire where I took my first larvae. There used to be a huge plantation of Sallow ringed by giant Oaks where the Herons nested above the River Wey but some years ago the Forestry Commission cleared the plantation during the winter when the larvae of *A. iris* were hibernating and replanted the area with small Oaks for experimental purposes. The butterfly still inhabits the woods but is now very scarce though a few favourable years could see it build up again.

Today the main hopes for the butterfly, apart from the activities in Oxfordshire, lie in the Forest complex of South Surrey, West Sussex and the Hampshire area bordering these two. This is today the largest area of oak forest left in England and it is fast being broken up by development or being replaced by dense coniferous woodland. Some collecting does occur in the area but it is still vast enough to minimise the effects of the collector but year by year the Oak gives way to conifer and unless a large enough area is left to act as a reservoir for the future, *Apatura iris* may not be seen flying in these woodlands by my grandchildren (should they materialise).

Those who have read the book on the Purple Emperor by Messrs. Heslop, Stockley and Hyde will appreciate the close relationship between terrain, vegetation and butterfly in the ecological status of the Purple Emperor and though I would reject some of the categorical statements made in that book it does indicate the importance of very many factors in the suitability of an area for the butterfly's continuance. Two factors I consider to be vital in all localities I have visited here and abroad—the first is the need for mature trees to supply the needs of the adult insect (honey dew, courting sites, resting places and launching sites) and shade for the larvae on the Sallows growing below the top cover; the second is a sufficiency of mature *Salix caprea* for the larvae. My own experience is that although the females will lay on small bushes,

the majority of eggs are laid on the mature (female) trees and it is these trees which produce the overwintered larvae in the Spring. The larvae thrive in wet conditions and, in the sleeved state at least, will die if subjected to strong sun. The females when laying tend to seek out the shaded Sallows and Heslop states a preference for the north side of the bush, although I now consider this to be wrong provided shade affects the whole bush. For reasons not at all clear there is a definite preference for certain trees when laying—it may be that they are near to a suitable 'dropping off' Oak or are better sited for shade, but such bushes will have a spattering of eggs while there may be none on the bush next to it.

With diminishing suitable breeding woodlands it is important to maintain such woods with strong breeding stocks and compensate for the losses caused by felling, accidents and predators. With this in view I, with others of the Society, have been breeding stock in captivity for release as adult insects. Ova are collected in August or small larvae in September. These are sleeved in the garden on potted Sallows for the winter. My own Sallows stand under a False Acacia (*Robinia pseud-acacia* Linn.) tree open to all its drips and produces nearly 100% overwintering success. When the butterflies emerge they are fed and released in their original habitat.

In 1966 I attempted hand-pairing with three pairs of imagines and in two cases the insects copulated. I eventually obtained 36 ova and in 1967 released 20 imagines in a Surrey woodland. However, the result was not very satisfactory as success at hand-pairing with this species is very difficult to achieve and attempts before and some since have led me to believe that it is better to release the adults as soon as possible back into their own habitat so that natural pairings can take place. This will avoid in-breeding and should ensure a much more successful mating chance with a greater number of ova deposited. One female in captivity laid about 140 infertile ova for me and dissected females have upwards of 90 ova present so that an average of 100 ova to a female is likely in good conditions. If a fair percentage of ova can be gathered up each Summer for overwintering in captivity then the stock of an area should show some benefit after one or two years. Observation of the butterfly shows it to be a strong flier with a large range when ova depositing—this ensures mixing of stock and ensures that predators do not find 'all the eggs in one basket'. For this reason it would be a waste of time introducing the butterfly into small protected woodlands unless there is other nearby woodland that could also support the butterfly. This is a third factor which may be vital—a wide area of suitable habitat.

Several observations of keeping the insect in captivity may be of interest. The larvae when hibernating may choose three sites in which to rest. The favourite appears to be the crotch made between two boughs or a bough and the main stem. Here it lies in the crotch curved round the join and when it has taken on its brown hue of winter it

disappears into its background. Others travel down the main stem of the bush and hibernate quite near to the ground (I have found overwintering Lappett (*Gastropacha quercifolia* Linn.) larvae in a similar position). They lie flat on the bark, rather like small bumps on the bark, and may be silver grey in colour to match the silver of the bark. A percentage however stay in the dead leaves which they have woven to the twigs by means of their silk. These larvae lie on the lamina of the shrivelled leaf, staying green until the leaf has turned to brown when they also change and merge into their background. These leaves are storm tossed throughout the winter and sometimes fall to the ground. In these latter cases the larva seems to find its way back up the stem in the Spring leaving the leaf with its little pad of silk lying on the ground nearby. I have never found the larva hibernating in the wild yet but see no reason why it should act differently. When larvae meet in the act of moving about from spray to spray the horns are used to displace each other and one witnesses a small 'stag fight', the smaller larva usually retiring to find another leaf of its own. The pupae are the most active I know and when touched they shake and leap violently, swinging on their silk pad. They colour up only a few hours before emergence and the majority of these take place in the evening or early hours of the morning so that the butterfly is ready for flight when the sun is up. In captivity the butterfly becomes very tame, makes little attempt to fly away when handled and feeds well, uncurling its yellow tongue in anticipation of food when the cage is opened. From my hand-pairing experience I would say that the males are ready for pairing about seven days after emergence and while the females mate when freshly emerged they do not develop their eggs until about fourteen days after emergence. This would account for the lateness of some of my observations of egg laying in the wild. The insect starts to emerge about June 20th and the rest are all out by mid-July. In the same batch of ova the larvae emerged and went into hibernation together but came out of hibernation over a period extended over more than three weeks. This undoubtedly led to the wide emergence range of the adults. Females out in mid-July would not start to lay until early August and with the sporadic nature of laying the laying could continue well into the month. At the end of August I have found ova, with hornless larvae and horned larvae all on the same tree, indicating a month approximately of ovipositing.

In 1969 I hope to be releasing a few more of this most beautiful of our butterflies—long may they grace our woodlands.

11.1.1969

P. W. Cribb (2270).

#### REFERENCE

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## NYMPHALIDS ON ROTTEN APPLES

During the autumns of 1967 and 1968 I have had reason to visit a large apple orchard near Ipswich, East Suffolk. On several occasions in both years I was surprised to see the large numbers of nymphalid butterflies which were feeding on the squashed and rotten fruit on the ground late into October and a few in early November. Red Admirals (*Vanessa atalanta* Linn.) were very common and I counted sixty on one occasion. During early October Small Tortoiseshells (*Aglais urticae* Linn.) were also fairly common and the Comma (*Polygonia c-album* Linn.) an occasional visitor. In 1968 one Painted Lady (*Vanessa cardui* Linn.) was seen but it was in flight, not actually feeding on the fruit.

The Red Admirals also tend to feed on apples which are still attached to branches but which have been damaged by wasps. They rest on the outer surface of the apples and pass the proboscis through the hole made by the wasp and into the tissue which has become brown with exposure.

Perhaps other members have witnessed the above feeding habits? I would be interested to know if the Peacock (*Nymphalis io* Linn.) also has a liking for apples because I have never seen this species in the orchard, although it does occur in the area.

L. McLeod (3534).



## ORTHOPTERA IN SOMERSET

Due to the wide range of suitable habitats it offers, Somerset is a good county for the Orthoptera Saltatoria, but our native cockroaches appear to be absent. (The distribution maps in Ragge show *Ectobius panzeri* Stephens as present in North Somerset, but the record is from Steepholme, which is in fact an offshore island.)

*Chorthippus parallelus* Zetterstedt (Meadow Grasshopper) is common throughout the county, tolerating all but the most adverse conditions. It is to be found in the boggy areas of mid-Somerset as well as in the Quantock and Mendip hills. *C. brunneus* (Thunberg) (Common Field Grasshopper) has a similar range, but dislikes the damper places, and tends to occur in smaller numbers than *C. parallelus* when both species are to be found together.

*Myrmeleotettix maculatus* Thunberg (Mottled Grasshopper) is often abundant in areas that satisfy its ecological requirements: dryish ground with stretches of short grass between higher vegetation or exposed rock. There is much habitat of this type in the Mendips and, as it totally disregards even the most exposed conditions on windswept hillsides, *M. maculatus* is commonest there, although it occurs elsewhere. The

relationship between background colour and predominant colour varieties is more striking there than I have seen it anywhere else. In the grassy areas on hilltops any varieties besides the green ones are usually very difficult to find, yet on the rocky areas, often only a few minutes walk away, the brown and grey varieties are abundant.

*C. horthippus albomarginatus* Degeer is locally common in the flatter parts of North Somerset (notably on Nailsea moor, about seven miles west of Bristol), but it has been surprisingly absent from parts of the central Somerset 'moors' that I have visited. *Stethophyma grossum* Linn. is to be found there. This impressive, and all too uncommon, insect is, I fear, on the decline in Central Somerset, and is becoming difficult to find in places where it was common only a year or two ago. *S. grossum* requires wet bog with exposed patches of water, and habitat of this type is decreasing there for reasons such as the lifting of peat, preparation for grazing, and the overgrowth of reeds. The latter is still occurring on the nature conservancy land on Meare Heath. I have seen *S. grossum* in grass alongside drainage canals, but I doubt if they breed there.

*Omocestus viridulus* Linn. (Common Green Grasshopper) is common, but it appears to be less so in the north of the county. It occurs, with *M. maculatus*, on the sides of 'combes' in the Mendips, where the partly purple varieties seem unusually common. *O. rufipes* (Zetterstedt) is extremely local.

*Pholidoptera griseoaptera* DeGeer (Dark Bush-cricket) is common almost everywhere in Somerset, always in or near hedges and bramble patches, although they wander quite a way into unmown grass. I saw my first adult this year on the 28th July, later than usual. *Leptophyes punctatissima* Bosc (Speckled Bush-cricket) has as wide a range, but is always less common, and certainly less conspicuous due to its colouration and lethargic habits. *Tettigonia viridissima* Linn. is widespread, but I have never found it as densely populated in hedgerows as in Devon. Along the country lanes at night *P. griseoaptera* can be heard stridulating far more often, at any rate in the north of Somerset.

*Meconema thalassinum* DeGeer (Oak Bush-cricket) is most frequent in north-west Somerset, which contains more woodland, but is not easy to find. It may well be common in Leigh woods, near Bristol, but I have not as yet looked there. I have seen *Conocephalus dorsalis* Latreille (Short-winged Cone-head) in association with *C. albomarginatus* on Nailsea moor, and also in parts of central Somerset.

The peaty moors west of Glastonbury are ideal habitat for *Tetrix subulata* Linn. (Slender groundhopper), which is abundant on mossy and exposed peat. Most specimens are unusually dark, which renders them inconspicuous against the black peat. *T. undulatus* Sowerby (Common Groundhopper) is also frequent here, and through most of the county. I have often found this species in open meadowland in Somerset, and is probably more common in this type of habitat than is generally thought. Besides the species already covered, *Gomphocerippus rufus* Linn. is known to occur in Somerset, but I have not found it myself so can give

no details of where. It is certainly very local. I should be very grateful to hear of any locality in Somerset (or Gloucestershire) where *Metrioptera brachyptera* Linn. (Bog Bush-cricket) may be found in reasonably large numbers.

Robin L. Hard (3629J)

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### INTERSPECIFIC MATING IN THE CHARAXIDINAE (NYMPHALIDAE)

While browsing through old numbers of the *Bulletin* I came across a reference to interspecific mating in the Plusiinae (Bradbury 1964). Having observed interspecific matings only very rarely, I thought that other members may be interested in the following two instances between *Charaxes* species.

In the late afternoon of June 27th, 1966, Dr V. G. L. van Someren and I were inspecting his *Charaxes* traps. These were situated in clearings in his garden, 'The Sanctuary', which is an area of unspoilt forest bordering the Ngong Forest near Nairobi, Kenya. It was our custom to approach the traps carefully and quietly so that the trapped butterflies were not disturbed.

On this occasion we were surprised to find a male *Charaxes candiope* God. in cop. with a female *Charaxes brutus* Cram. We observed the two insects for some minutes before attempting to remove them carefully without causing them to separate. Unfortunately we were not successful and they separated.

I retained the female and caged her with the normal foodplant for *C. brutus*, i.e. *Ekebergia capensis* Sparrm. (Cape Ash). By July 9th forty eggs had been laid and first instar larvae commenced hatching on July 11th. A total of 67 eggs were laid before she died. Regular feeding was difficult to maintain over this period because I was often working upcountry, consequently the duration of larval life was increased. The larvae were still in their fifth instar in mid-September. Adults began to emerge from pupae during early October. All were normal *C. brutus*. Obviously these butterflies were the result of a previous mating with a male *C. brutus*.

The second example was reported to me later in the same year. During late August, 1966, while on a visit to Keekorok Lodge, in the Mara Game Reserve in Western Kenya, Mr Stephen Collins of Endebess observed a male *Charaxes candiope* in cop. with a female *Charaxes varanes* Cram. These were also in the top of a *Charaxes* trap.

It would appear that the close proximity of the trapped butterflies to each other results in interspecific mating. In the wild state it is unlikely that such matings would occur.



I would be interested to hear if any other members have witnessed interspecific mating in the Nymphalidae, and also if any member knows how long *Charaxes* must be in cop. before transference of spermatozoa takes place.

L. McLeod (3534).

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#### NOTES FROM A FINNISH DIARY—IV

##### The 'Kangasperho', *Callophrys rubi* Linn.

When the Nettle-butterflies (*Aglais urticae* Linn.), Lemon-butterflies (*Gonepteryx rhamni* Linn.) and Mourningcloaks (*Nymphalis antiopa* Linn.) have dispersed themselves among the forests and copses, to be seen basking against a background of withered autumn grass, the snow has retreated into the darker hollows of the spruce forest and *Brephos parthenias* Linn. and *Epirrhantis diversata* Schiff. have mated and begun to lay their eggs, there is a lull of a fortnight or so. The sallow blooms turn old, the Blue Anemones (*Anemone hepatica* Linn.) and soon the white ones (*Anemone nemorosa* Linn.) come into flower, and then the small green "mouse-ears" of leaves appear on the birches. As the first buds break out on the Bilberry (*Vaccinium myrtillus* Linn.), the Finnish 'Heath-butterfly' (our Green Hairstreak) emerges literally from the ground.

In 1967 *C. rubi* was on the wing from the middle of May until nearly the end of June. The first specimens appeared along the side of the dirt road in Area E (see Notes III) on May 13th. The weather deteriorated rapidly that evening, and a specimen which I spotted at rest on a sallow bush was still sitting in exactly the same position at mid-day on the 15th.

The species quickly became common, the butterflies gathering in groups in the forest wherever the trees (mainly *Picea* sp. and *Pinus* sp.) allowed the sunlight to filter down to the Bilberry and Red Whortleberry (*V. vitis-idaea* Linn.) bushes. It appeared to be most abundant between about May 21st and June 6th, and the recorded number had dwindled to five by June 26th, after which I left for Lapland. At the peak of its flying period it was so well dispersed that I was not really surprised upon

seeing a specimen on June 2nd flying along the main street of Tampere, a very busy city!

My original pair (caught in cop on May 13th) was placed in a make-shift cage during the wet week commencing May 14th, after which several more females were added. The foodplant I provided was *V. myrtillus*, but although the butterflies were often seen crawling over the leaves and opening flower-buds when sunlight came into the veranda, I could find no eggs when the time came to dissect the vegetation under a handlens.

An observation made on May 28th (Area F) suggested one reason for my failure. Large numbers of females were seen fluttering round the 8–10 cm high bushes of *V. vitis-idaea*. Finally, an egg was found tucked in the flower-bud of a plant from which a female had taken wing. A dozen ova were eventually obtained by watching the adult insects, and all except one were deposited in the calyces of the flowers, usually being introduced into these niches sideways on (Fig. 1). The exception was deposited on the lower surface of the leaf, rapidly, without the usual initial scrutiny of the site by the female insect. Oviposition in the broad sense was an act which took from one to three minutes to accomplish.

A large number of different pabula has been recorded for this species in Finland, varying among the Betulaceae, Rosaceae, Papilionaceae, Rhamnaceae, Ericaceae and Scrophulariaceae families (Seppänen). All the text-books to hand quote *V. myrtillus* as being the standard food, but this is contrary to my own experience mentioned above. Almost certainly, however, both of these *Vaccinium* species are utilised. In addition, it is said that *V. uliginosum* Linn. (an inhabitant of swampy country) is often adopted. When one takes into consideration the prolificity of plants of the *Vaccinium* kind in the forests, heathlands and swamps of southern Finland, it is no longer surprising that on a good day towards the beginning of June a hundred specimens of this butterfly can be counted on a casual walk.



Fig. 1 Female *Callophrys rubi* Linn. ovipositing on *Vaccinium vitis-idaea* Linn.: First-stage larva. (South Finland, 13.6.67.) (Butterfly one and a half times life-size, caterpillar approx. times eight.)

The first stage larva (depicted in Fig. 1) is fashionably attired in long hair, and it is dull brown in colour. The egg is bright green, as is the caterpillar beyond the second moult. The pupa, which forms on the ground, is pale brown, marked with darker brown. My three pupae all emerged during the winter (Nov. 16th, Dec. 27th, Jan. 2nd). These were kept indoors and received no prior 'cooling treatment' (c.f. my *Sphinx ligustri* Linn. pupae, which I am told will not emerge until they have been previously placed in the refrigerator for a few days). The 'hair-streak' of specimens noted in South-Häme is extremely variable in prominence, even when specimens are taken within a small area.

The flowers visited by this species were the *Vaccinium* species, *Anemone nemorosa* and *Antennaria dioeca* Gaertn. (Common Cudweed), though doubtless there are others.

Finally, an estimate was made of the snow depth covering the area in which the butterflies had been observed laying. This estimate was carried out on March 19th, 1968, when it was found that any pupae surviving in that situation would be covered by an average depth of 51 cms of snow. Three days later the Helsingin Sanomat newspaper published a map showing that the average snow cover for the Tampere district was 50 cms. One wonders how many pupae are literally crushed to death (the ground there is rocky) and how many are adversely affected by melt-water.

### **The 'Ketokultasiipi', *Palaeochrysophanus hippothoe* Linn.**

That I discovered any larvae at all of the 'Field Gold-wing' was attributable more to chance than to dedicated scrutiny of its foodplants, *Rumex acetosa* Linn. and *R. acetosella* Linn. During the early part of June I was accustomed, when investigating Area F, to retire to a rock and grass-strewn glade south of where *C. rubi* flew to eat my lunch and clear my butterfly-net of mosquitoes. On June 4th I sat wondering about the scarcity of the Small Copper (*Lyncaena phlaeas* Linn.) and, noting that its foodplants, *Rumex* spp., were poking up their heads from the grasses, I began to crawl lazily about, trying to keep the wood ants from my cheese sandwiches and the mosquitoes from everywhere else. The plants yielded nothing until, returning to the rock on which I customarily sat, I gazed over the side and saw a much-eaten specimen of *R. acetosa*. I soon discovered a pale green larva, traditionally 'slug-like', lying along the midrib of a partly demolished leaf. Three larvae were shortly collected, and all of them were about 15 mm. long, pale green above and round the sides, yellowish beneath. A fourth, smaller larva completed the bag.

The larvae were transported safely home, where they were placed in individual glass tubes and carefully inspected. Their markings indicated *Heodes virgaureae* Linn. (the head being brownish), but the choice of foodplant suggested *P. hippothoe*. Clearly, I simply had to wait for the imagines to emerge. Pupae materialised between June 10th and 13th,





Fig. 2 Pupa of *Palaeochrysophanus hippothoe* Linn. (upper) lateral aspect (lower) dorsal aspect. (South Finland, 13.6.67.) (Four and a half times life-size.)

being at first yellowish, then pale buff in hue, with black markings which were fully developed within twelve hours (Fig. 2). They were about 12 mm. in length, and were attached to leaf blades by means of an anal pad and a cord passing either side of the anterior quarter of the wing cases. These all emerged in Lapland, the final one on July 7th, and they were all *Palaeochrysophanus* females.

In another area (Area H), where *R. acetosa* grew quite abundantly along the edges of a cart track, four young larvae (length c. six mm.) of a similar kind were obtained from one plant, and a fully grown specimen from another, on June 11th. The fully grown individual again produced a female *P. hippothoe* in Lapland, but the small larvae all turned dark brown, and from these four hymenopterous parasites emerged within a few days. These smaller specimens may have been *H. virgaureae*, as that species hibernates in the egg stage.

It is of interest to note that, although several 'wild' specimens of 'hippothoe' and 'virgaureae' were noted in the summer of 1967 (see Notes III), I am still wondering upon the whereabouts of the 'very common' *Lycaena phlaeas*.

20.5.1968

Leigh Plester (2968).

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## THE STUDY OF MAYFLIES (EPHEMEROPTERA)

### Introduction

It is often stated that the day of the amateur naturalist as a serious contributor to knowledge is over. The argument, when the statement is proffered as an arguable point and is not one of those doleful assertions about the passing of the Good Old Days in which some elderly folk delight, is that today anybody with a taste for Natural History gets a job as a scientist, and that advances in science are possible only with the aid of apparatus that private individuals cannot afford to buy. There is some force in the first point. Obviously we shall not return to the conditions of a century ago when there were hardly any paid posts and when science was pursued by those who had sufficient money not to need a paid post. However, the probability is that, in the future, the working week will shorten and everybody will have more leisure to devote to something that interests him or her. The second point has no force at all, and indeed can be used to support the opposite point of view. Because laboratory apparatus is now complicated, there is a tendency to look down on the biologist who does not use it and, as nobody wishes to be looked down on, few professionals now make direct observations of animals in their usual surroundings to explain problems to which an answer is sought. Some problems, however, are more likely to be solved by observation in the field than by experiment in the laboratory. Many have tried to explain the distribution of a particular species in terms of the chemical composition of the medium in which it lives, although in fact the creatures occur where they do because that is where the female chooses to lay her eggs. Unless the present trend is reversed, amateurs are more likely to solve these problems than professionals. 'Solve' perhaps is a pretentious word to use, for the explanation of any biological observation usually poses further questions and opens up further fields of investigation. To revert to oviposition: observation of the egg-laying female may explain why larvae of a certain species are restricted to a certain type of place but it poses the further problem of what determines the female's choice. This may prove a problem for the biochemists. But at least it may be said that amateurs are likely to formulate the problems and provide the basic information without which the professional can easily waste his time.

One of the fields to which amateurs have made a notable contribution in the past is the description of species. The group under discussion was monographed with professional competence by one of the Victorian naturalists already mentioned, the Reverend A. E. Eaton. Biology owes a great deal to country parsons of that era. Eaton's descriptions are still referred to today, but a modern key to the adults has been written by the well known British Museum expert, Mr D. E. Kimmins (Freshwater Biological Association Scientific Publication No. 15). Descriptions of the species of most groups were completed during

the last century but they were generally of the adults only. Keys to the immature stages, often of more importance to the freshwater naturalist, are generally much more recent. The nymphs of the British species have all been described and a key to these has appeared in the same series (No. 20). The student of the Ephemeroptera, therefore, can lay his hands at once on up-to-date keys to both immature and adult stages, and he should have no difficulty in naming species.

### Anglers' names

The scientific names of the group, thanks to the sound pioneer work of Eaton, have been subjected to little change, and the beginner is not likely to be confused, as are students of some other groups, by the finding of the same species referred to by different names in different works. On the other hand he will not find any suitable English names. Anglers have a nomenclature of their own designed for their particular purpose. Some of their names apply only to one sex at one stage; Burmeister, for example the Iron Blue Dun is the subimago of both *Baetis pumilus* and *B. niger* Linn., and the imagines of the two are Jenny Spinners if male and little Claret Spinners if female. Not one of these names is applicable to the species as a whole, which makes them unsuitable for general use. Moreover anglers fall foul of the entomologists over the use of the term 'mayfly' to cover the whole group. They apply it to certain stages of the genus *Ephemer*a only. Here, therefore, only Latin names are used. It is strange to find that some people shrink from a Latin name (more properly latinized, for often only the termination is Latin), fearing that it is something learned and obscure designed to withhold knowledge from all but a circle of the élite, like the medieval Latin that a doctor writes on a prescription form. Strange and unreasonable, because such people have no difficulty with friends of Celtic origin whose difficult names are derived from a language with far less affinity to English than Latin.

### Life cycles

There is a widespread belief, which the writer has seen repeated in the most reputable journals twice within the last few weeks, that mayflies live for but one day. They must, therefore, have 365 generations in a year, a logical deduction from the first statement that a moment's reflection will reject as ridiculous. In fact, of course, although the adult life is short—it has to be because the mouth parts are atrophied and no feeding is possible—the nymphal life may be comparatively long by insect standards. The unique feature of the group is not the short adult life, but the fact that, after a large number of moults in the aquatic stage, the winged form that emerges is not the adult, and there is yet one more change of skin before this stage is reached. Scientists refer to subimago and imago, anglers to dun and spinner. A misconception, repeated in



several current books, is that the cast subimaginal skin retains its form, so that the naturalist who has boxed a subimago is astonished to find that he has apparently two specimens when next he looks in his box. In fact the wings of the subimaginal skin shrivel, and nobody has ever been astonished in this way.

The life histories are intriguingly different not only from species to species but within one species at different places. This means that there is endless scope for study, and that, if two naturalists are studying the same species in different places, the result is likely to be, not a useless duplication of effort, but an instructive comparison. For example, the present writer was studying the life history of *Rhithrogena semicolorata* Curtis in a stream in the Lake District when he received an account of a similar study in South Lancashire from Dr Janet Harker. Being second in the field proved an advantage. The first account could do no more than present the facts, the second could make comparison and draw deductions. *Rhithrogena semicolorata* is a winter species that grows all through the winter and emerges in the Lake District in late May and early June. The eggs do not hatch till August. Dr Harker recorded a longer emergence and earlier hatching. She also recorded a lower water temperature. A correlation was postulated. Further studies of the life history of this species in warmer and in colder water would be worth making. Ultimately the exact way in which temperature influences life history can be discovered only by experiment, but the more extensive the field observations the more precisely will it be known what experiments should be carried out.

There are two other aspects of the life history of *Rhithrogena semicolorata* that deserve mention. Adults are on the wing for six, perhaps eight, weeks and egg-laying must, therefore, be restricted to this period, yet the smallest nymphs occur throughout a period of nearly six months. There are two possible explanations: either some eggs take much longer to incubate than others, or the incubation period varies little but some nymphs do not start to grow until several months have elapsed. That the first explanation is valid for *Baetis* sp. has been demonstrated by the German scientist, Professor J. Illies, and it has been shown that the second possibility is the reason for the persistence of tiny nymphs in other groups. Larger specimens may inhibit the growth of small ones either by means of a secretion or by occupying the relatively few vantage points from which sufficient food for growth can be obtained. This, however, remains a field in which a great deal of work remains to be done. The other noteworthy point about the life history of *R. semicolorata* is the waiting period which large nymphs enter. Those that are first to hatch grow at a rate which appears to be steady and independent of temperature and they may reach full size by Christmas. Growth then stops. Some tiny nymphs are still present at this time and their growth starts soon and proceeds at a rate similar to that of nymphs developing at the end of the previous year. Some may not reach full size till normal emergence time is reached and then

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they and those that reached full size much earlier emerge within a short time of each other.

Few insects fly in winter, because, it is supposed, the air temperature may be too low for a cold-blooded animal to be active. Whatever the explanation, many aquatic insects have some means of avoiding emergence during the winter. One of them is known as diapause and a good example is provided by the dragon-fly *Lestes sponsa* Hansemann. The eggs are laid in summer, and the embryo starts to develop because the temperature is above the threshold at which this process ceases. At a certain stage, however, development stops even though the temperature is above the threshold and it continues only after the egg has been subjected to low temperature. This ensures that the eggs of *Lestes* cannot hatch until the following spring. The rate at which the days are growing longer or shorter determines whether certain other species continue development or enter a resting phase. This is the kind of discovery that intrigues the scientific mind. Sometimes the enthusiastic search for a complicated solution, and diapause can be much more complicated than the bare outline given above might suggest, leads to the overlooking of more simple explanations. Sometimes growth stops because food is in short supply.

*Rhithrogena* was referred to as a winter species. It is convenient to group together all species with a similar life history; science would founder in a slough of detail if such generalizations were not made. There is, however, a danger that must not be lost sight of. A nice scheme of classification is sometimes mistaken for a scheme of explanation, and the possibility that one goal may be obtained by different routes is overlooked. In contrast to the winter are the summer species, of which the most striking example is *Ephemerella ignita* Poda, whose subimago is known to anglers as the Blue-Winged Olive. In several small stony streams that have been investigated nymphs (fig. 1) are first found in late May or early June and by September only a few stragglers remain. Development is completed in a month or so and the rest of the year is spent as an egg. This life history, however, is far from universal; in south-country chalk rivers nymphs are to be found in every month and even adults have been recorded the year round. Whether this is produced by more than one generation a year, or by a single generation developing at different times only careful observation in a number of places will show. Then the question of an explanation will be posed.

Some species in the genus *Baetis* belong to this group, though possibly they achieve more than one generation in a summer. Two of the commonest, however, *B. rhodani* Pictet and *B. pumilus* have two generations, one that grows slowly throughout the winter and one that grows quickly during the summer. The elucidation of this life history is complicated by the delayed hatching of the eggs, already mentioned, and might have defied analysis but for the fact that the adults appearing during the first part of the summer are upwards of twice the size of



Fig 1 *Ephemerella ignita*.

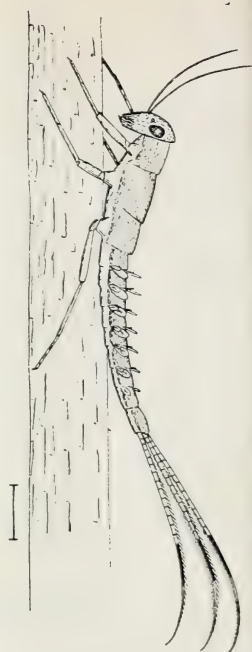


Fig. 2 *Cloeon dipterum*.

those appearing in the second part. The assumption was made that the former are derived from the slow-growing winter generation and the latter from the quick-growing summer one.

*Cloeon dipterum* Linn. (fig. 2) may have a superficially similar life history but there is not much growth in winter and the emergence periods are shorter. Dr D. S. Brown has found that there may be more than one summer generation, the number rising with increasing temperature, and in the north there is often only one generation in a year.

Whether *Ephemera* takes more than one year to complete development has been disputed. There seems no reason why both sides should not be right. More observations will be interesting.

The study of life histories involves frequent and regular collecting from the same place, and measurement of the specimens caught. It will not appeal to those for whom natural history is a good reason for exploring new countryside. For these the study of ecology and distribution will be more attractive. One regrettable fact must, however, be

stressed; the most agreeable time for exploring the countryside is the worst time for collecting Ephemeroptera. Some of the commonest species are winter growers, and they are present only as eggs or tiny nymphs during the usual holiday months. The writer receives a few letters each year from parties of naturalists, generally students, who are making a long-vacation expedition to some out-of-the-way place and who hope that he will be interested in the resulting collection of mayflies. The reply has to be that such collections will be too incomplete to be of interest; if the expedition could return in February, March or April, it would be another matter.

## Ecology

In productive ponds of the type common in the south and east of England, the only species often encountered is *Cloeon dipterum*. The other species in the genus, *C. simile* Eaton, also dwells among weeds but in deeper water, which means that it is absent from the smaller ponds, but may, on the other hand, inhabit much larger bodies of water than *C. dipterum*. In the north and west, where ponds are generally in an unproductive peaty basin, the species are *Leptophlebia marginata* Linn. and *L. vespertina* Linn. Nobody has ever sought out a series of ponds extending from one extreme with *Leptophlebia* only to the other with *Cloeon* only, with a view to finding something with which the change might be correlated. At present it is possible to do no more than speculate. *Leptophlebia* grows in winter, *Cloeon* in summer, but the significant point may well be that the eggs of *Cloeon* hatch very soon after they are laid, and those of *Leptophlebia* do not. Some of the productive ponds where *Cloeon* is found have very little oxygen, at least near the bottom, at times during the summer, and it is possible that these conditions are lethal to the eggs of *Leptophlebia*, immobile throughout the critical time, but not to *Cloeon* which passes so rapidly from this vulnerable stage to a mobile one in which unfavourable local conditions can be avoided. This could be the reason why *Leptophlebia* is barred from one end of the range but not why *Cloeon* is barred from the other. It is often stated that peaty water contains humic acids which are toxic to many organisms, though this remains to be established definitely. If it be assumed to be true, there remains the question of whether the nymphs of *Cloeon* are affected directly, or indirectly through their food.

Food as a factor affecting distribution is not easy to study. All British Ephemeroptera, as far as is known, feed either on vegetable matter or on the detritus that accumulates in any piece of fresh water. It is simple to ascertain what they eat, far less simple to discover from what they derive their nourishment. Dr H. B. N. Hynes believes that the chief source of food for animals in a stream is the dead leaves blown in from the land, but, he has suggested, the animals cannot digest dead leaves, and utilize only the bacteria and fungi that are in



the process of breaking down the vegetable tissues. The problem, therefore, passes into the field of microbiology. Dr Hynes and his team, now operating in Canada, are working on this problem at the present time.

The reader will have noticed that in both genera mentioned there are two species. According to what is inappropriately known in Britain as Gause's hypothesis, two species with the same way of life cannot live together. The two species of *Cloeon*, as already noted, are not identical, because they occupy different habitats. Moreover, they are separated in time, nymphs of one species being small when those of the other are large. For example in a moorland fishpond studied by the writer, most nymphs of *Cloeon simile* are 5-6mm long during the winter and the adults are on the wing in April and May. The next generation appears in September. Those of *Cloeon dipterum* are 3-4mm long during the winter and emergence takes place in June and July. On the other hand the habitats of both species of *Leptophlebia* appear to be identical. Here too, however, there is temporal separation. *L. marginata* is bigger than *L. vespertina*, and emerges about a month earlier. It probably hatches earlier, also, and is, therefore, always larger. If it be assumed that nymphs of different size have a different diet, *Leptophlebia* also proves to be no exception to Gause's hypothesis.

More species of Ephemeroptera are found in a lake than in a pond. Anyone turning over stones near the edge of, for example, a lake in the Lake District will soon come across *Ecdyonurus dispar* Curtis and *Heptagenia lateralis* Curtis. Both belong to a family whose nymphs are highly modified; the body, particularly the head and the femora, is flat and the legs project sideways. The whole is adapted to life on a flat hard surface and the animals can progress with considerable speed while remaining closely pressed to the rock or stone. Stones and rock are found only where current or waves have enough force to remove finer particles and it is not surprising, therefore, to find that the inhabitants of this substratum have evolved a form which prevents their being removed too. It is probably difficult also for a predator to pluck them off. Another species of the stony shore is *Centroptilum luteolum* Mueller. It is not flattened and can swim rapidly by means of the short tails, which are closely beset with hairs down the sides. It is much smaller than the ecdyonurids, and doubtless takes refuge beneath the stones when waves are beating on the shore. It is one of the most easily distinguished nymphs. Its tails are marked with narrow black rings but no broad bands, as are those of *Cloeon*. Its gills are simple plates ending in a point. It matches a sandy bottom and a characteristic pattern is discernible under a microscope.

Large calcareous lakes are rare in England, Scotland and Wales, but common in Ireland. On a stony bottom in one of these, two common species are *Heptagenia sulphurea* Mueller and *H. fuscogrisea* Retzius. The latter is known to the writer only from one locality in England, the River Kennet near Reading, where it is found on the stems of such plants as Iris and Burr-reed. There seems no reason why a nymph

adapted to live on a flat surface should not cling to plants of this type as well as to stones, but this is the only place where I have ever seen one of them doing this. It is perhaps a matter of behaviour, a hypothesis which could be, but has not been, tested by a simple experiment.

*Leptophlebia* also inhabits the stony shore but, in the Lake District lakes, it is hardly ever taken except near the time of emergence. A visit to Windermere by the Newcastle University Sub-Aqua Club provided evidence that this is because at other times of year it is at a depth beyond the reach of a collector who, working from the shore, cannot sample the bottom in water deeper than the length of his arm.

Where there is less water movement, either in deeper water or in a bay, sand and finer particles floor the lake. Here may be found nymphs adapted for burrowing. *Ephemera danica* Mueller is one of the largest species and, with its short broad legs and feathery gills arched over the back, one of the most distinctive. The legs recall those of another burrowing animal, the mole. The feathery gills form a tunnel supporting the substratum above it and keeping it away from the back of the animal along which their beating maintains a flow of water. *E. danica* inhabits sands, *E. vulgata* Linn. mud (fig. 3). The third species, *E. lineata* Eaton, is rare.

A more deeply indented bay will be colonized by reeds, in which *Leptophlebia* is abundant. Also to be found is *Siphonurus lacustris* Eaton, a swimming nymph like *Cloeon* and *Centroptilum*, but bigger when full grown. This species occurs also in streams, generally high up in the Lake District, where these run sluggishly over a flat area of land. In Brown Cove, to the north west of Helvellyn, there is a small tarn, not much over a foot deep, dammed to supply water to a mine. The bottom is sandy. *Siphonurus* is abundant here and when the nymphs flee at the approach of an observer, they appear at first sight like a swarm of shrimps. *Siphonurus* has an inexplicably sporadic distribution. *S. lacustris* is generally, but not always found in places of the type mentioned and occasionally in slow rivers. The records of *S. armatus* are from more calcareous waters, but it is difficult to make out a significant difference between the few places where it does occur and the many where it does not. *S. linneanus* is widespread in northern Europe but the number of records is small in all countries except Ireland, where it may be encountered frequently.



Fig. 3 Nymph of *Ephemera vulgata* in its burrow.

The fauna of small stony streams is now comparatively well known. Streams on Dartmoor, in Shropshire, in the Lake District and in the Pennines have been studied and there has been much work done in Wales and Scotland also. The common species are:—

*Baetis rhodani* Pictet

*E. venosus* Fab.

*B. pumilus*

*Heptagenia lateralis* Curtis

*Rhithrogena semicolorata*

*Ephemerella ignita* Poda

*Ecdyonurus torrentis* Kimmins

Two of these genera, both flat stone-clingers, have been encountered already on the stony lake shore, but it will be noticed that the species in the genus *Ecdyonurus* there was not the same. Also belonging to this family is *Rhithrogena*. Neither species in this genus occurs outside running water, a distribution of which the explanation falls within the sphere of physiology rather than field observation. The gills of *Rhithrogena* are modified to form a sucker for adhesion to the substratum, whereas those of *Ecdyonurus* and *Heptagenia* are free to beat and maintain a current of water over the body. A Swiss scientist, Dr. H. Ambühl, imprisoned nymphs in an apparatus through which water could be passed at a known speed, and he measured the uptake of oxygen at different current speeds. *Rhithrogena* used more oxygen the faster the current. The other two did not. *Rhithrogena* evidently depends on a continuous flow to bring sufficient oxygen for active life, but *Ecdyonurus* and *Heptagenia* in still water can create a sufficient current for this purpose by beating their gills.

Nymphs of *Baetis* are swimming forms but their gills are smaller than those of genera already mentioned and almost immovable, which is likely to be the reason why this genus also is confined to running water. *Ephemerella* is characterized by the position of the gills, which lie on the back and do not project from the sides as do those of most genera. It cannot swim actively and reaches its greatest abundance in the vegetation of productive rivers. Nevertheless it is often fairly numerous in stony streams even in reaches where very few of the stones are covered with moss.

Once a definite association of species of this kind has been discovered, the naturalist will seek varying environmental conditions to see whether corresponding variations in the animal community can be observed. The student of stream faunas will move upstream and downstream, and pass to waters with slower flow. With increasing altitudes, *Ecdyonurus* tends to drop out, and stoneflies become more numerous relative to mayflies. At about 1,000 feet, *Baetis tenax* Eaton and *Ameletus inopinatus* join the community. It is tempting to suppose that species confined to high altitudes are intolerant of the higher temperatures lower down, but this temptation must be resisted. A competitor may keep a species out of a region in which, alone, it would flourish. A tentative correlation has been made between temperature and the distribution of *Heptagenia lateralis*. The writer and his col-



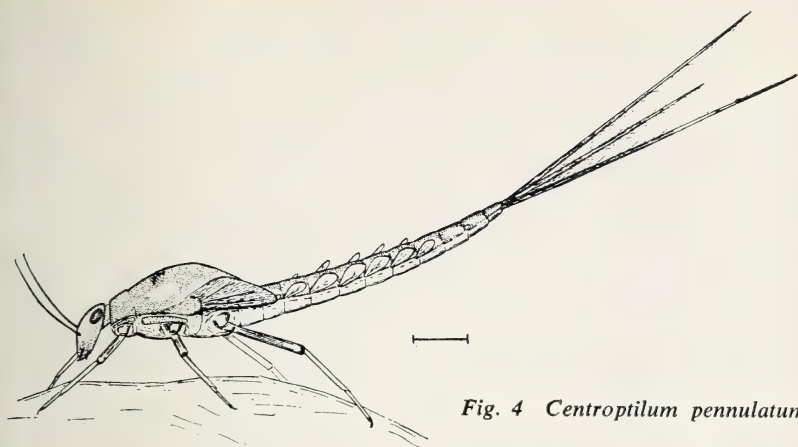


Fig. 4 *Centropilum pennulatum*.

leagues found this species to be abundant in many small Lake District streams, but absent or scarce in others. In the hope that light might be thrown on this, maximum and minimum thermometers were concealed in a number of streams, by good fortune during a long fine summer. Most streams reached a maximum in late May and thereafter in every sunny spell until mid-September reached a level that rarely differed

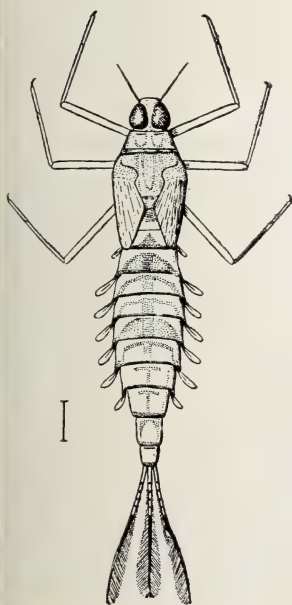
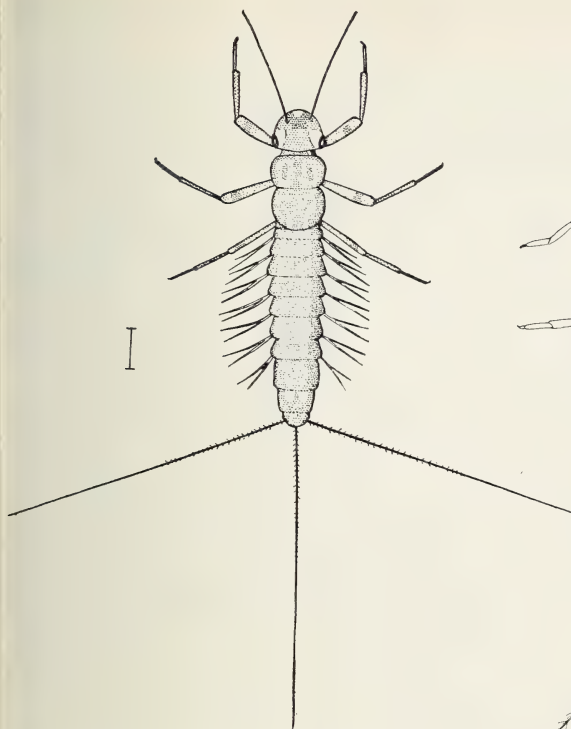
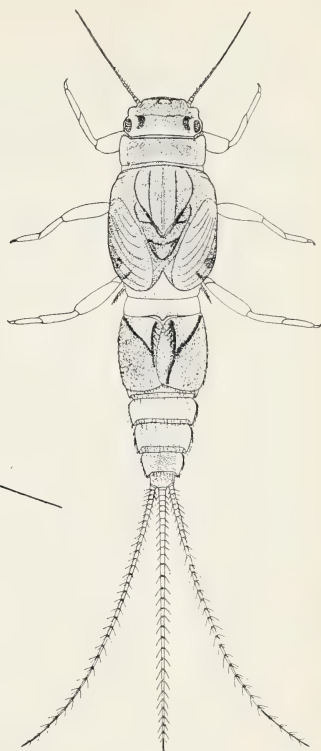


Fig. 5 *Baetis rhodani*.

from it by more than a degree or two. The range of maxima was found to be surprisingly large—from 16 to 28°C. The highest temperature was in a stream that originated from a sheltered swamp and flowed slowly in a channel not shaded by trees. The coldest stream sprang from a thick deposit of soil in a valley facing north and flowed through a wooded gorge. *H. lateralis* was generally found where the maximum did not exceed 18°C and rarely in streams that were warmer. No experimental confirmation of these field observations has been made.

Small stony streams run together to form rivers which may retain the same general character if the slope is steep enough. There must, however, be certain differences; in the first place the water is more productive because it is receiving the debris and the drainage from a larger area; secondly everything is on a larger scale, which may mean that some small local feature, such as a sand-floored bay, reaches at a certain point downstream a size at which it can support a viable population of a species that dwells on such a substratum. Though little more than speculation of this kind can be offered as explanation, the fact that increasing size goes hand in hand with more species is well established. *Centroptilum pennulatum* Eaton, *Procloeon pseudorufulum* and *Baetis scambus* Eaton are probably associated with bays where flow is less, because they are found also in small streams whose flow is slow enough to permit sand and gravel to settle. Less easy to explain are changes within genera typical of swift conditions. *Ecdyonurus torrentis* is confined to small streams; *E. venosus* occurs in small streams and rivers; *E. dispar* Curtis has been recorded only from rivers, and the change to *E. insignis* Eaton may be associated with change to calcareous conditions. In other genera the stream species persists and is joined by a river species: *Ephemerella notata* and *Rhithrogena haarupi* Petersen. *Heptagenia lateralis* is replaced by *H. sulphurea*. Two extremely rare species known only from large rivers are *Ephemera lineata* and *Potamanthus luteus*.

The starting-point of this story is well established, but the rest is based on a very limited number of records and requires confirmation. It is no accident that small stony streams have been studied and stony rivers ignored; sampling is so much easier. This is a pity because there are likely to be small stony streams in much the same condition as to-day for many years to come, whereas all kinds of covetous eyes are cast on rivers. To the water engineer it is so much good water rushing to waste at a time when finding sufficient to satisfy the ever-growing needs of an industrial society is proving harder and harder. To the electrical engineer it is an untapped source of power. To the drainage engineer its alternating deeps and shallows, its curves, its backwaters, its shingle spits, in short those features which the angler, the naturalist and the lover of the natural scene prize, are encumbrances whose removal would achieve the desirable effect of speeding the passage of flood water to the sea. The agriculturalist as well as the industrialist may see a precious commodity in the passing water, and for long all

Fig. 6 *Paraleptophlebia submarginata*.Fig. 7 *Caenis rivulorum*.

sorts and conditions of men have esteemed running water for the way it takes out of sight, and therefore out of mind, anything they happen not to want. All this has been going on for a long time, but we cannot do more than guess at its effect on the fauna because so many old records do not mention a precise place nor describe exact conditions. If a determined effort could be made today to find out what inhabits our big rivers and to record the observations carefully, we, or our successors, will be able to follow more accurately the inexorable impoverishment of our fauna as the urbanization of the country marches on.

If the flow of a small stony stream falls to a rate at which sand settles, tufts of such plants as Milfoil occur. In them the nymphs of *Baetis niger* are generally found. Other species typical of such stretches are the two species of *Centropilum* and *Procloeon pseudo-rufulum*. *Paraleptophlebia submarginata* (fig. 6) is another species that occurs when flow is not too fast; possibly it is joined or replaced by



*P. cincta* in rivers, but the number of records is too small to warrant a definite assertion.

When a river becomes slow enough to allow rooted plants to colonize the bottom, great number of *Ephemerella* occur, and *Baetis vernus*, *B. atrebatinus* join *B. rhodani*, *B. pumilus* and *B. niger*. With increasing sluggishness the mayfly fauna may consist largely of *Cloeon*, the pond species.

The genus *Caenis* has received little notice so far. Its nymphs are small and burrow in the substratum. The first pair of gills is reduced to a thread-like appendage on each side. The second pair is large and covers the rest, which are feather-like, as are those of the other burrower, *Ephemerella*. *C. rivulorum* (fig. 7) is found in the slower parts of small stony streams. *C. moesta* was added to the British list during the war by Mr D. E. Kimmins, who found it inhabiting gravelly parts of Windermere. *C. horaria* occurs in muddier places in lakes and ponds. *C. macrura* appears to be confined to large rivers. *C. robusta*, the largest, was first recorded in Britain by Dr H. B. N. Hynes and the writer during the course of a summer meeting of the Ecological Society in The Norfolk Broads. After the nymph had been described, it was recorded from several other places, all productive localities with a bottom of rich black mud. Possibly the adult had escaped observation because it emerges early in the morning and then mates, lays eggs and dies before most naturalists are afoot.

## Predation

It may be stressed again that much of this account is based on scanty data. Much more careful collecting is required before the habitat of each common species, and the distribution of those species that are rare, or are thought to be rare, can be defined. Nonetheless it seems clear that each species is confined within a limited range of conditions. How this comes about is a fascinating problem. A few of the factors have been mentioned. The work of Ambühl on oxygen is one of the few comprehensive studies of a single factor. The influence of the rest is largely speculation based on field observation unconfirmed by experiment; temperature is a good example of this. Clear examples have been described in other groups of the limitation of the range of one species by another, generally a close relative, and further work will probably disclose it in the Ephemeroptera also. Behaviour has been mentioned, so has food though only in the most nebulous way. Another factor, until recently ignored by professional scientists obsessed with their measurements of physical and chemical factors, but now coming to the fore thanks to the work of Dr T. B. Reynoldson and his school on flatworms, is predation. It is probably responsible for the distribution of Ephemeroptera that has recently been described in Windermere. Most of the shallow water in this lake lies over a stony substratum. On this, in the middle of the north basin, Plecoptera, and Ephemeroptera

of the species mentioned above, are numerous, and few animals that are not insects occur. The collector travelling north or south finds a steady diminution and eventual disappearance of stoneflies and mayflies and a corresponding increase in the number of flatworms and various crustaceans. The abundance of these appears to be associated with the enrichment of the lake by sewage effluent. The nature of the relationship is unknown; probably small worms, and other animals on which the large ones mentioned feed, are much more abundant in the richer water. Once they have become numerous in the regions where the food supply is good, these animals, it has been suggested, exterminate the mayflies and stoneflies. Possibly they eat most of their eggs, which are laid in a haphazard way. It is unlikely that there is anything toxic in the sewage effluent for it is well purified and greatly diluted.

The distribution of the young of some groups is brought about by the habits of the egg-laying female, but this is unlikely to be true of most Ephemeroptera because the eggs are laid in such a haphazard way. Many seem to be unable to distinguish between water and any other shiny surface such as a wet road or even a polished car. It seems scarcely likely that they select a particular kind of water. However, some species of *Baetis* crawl down into the water and glue their eggs to some solid object. These certainly appear to select a site for their eggs. The whole subject of egg-laying is worth much more careful study. So also are the dancing swarms of the males. A good account of these is given by J. R. Harris (1952) in 'An Angler's Entomology' (London: Collins, New Naturalist No. 23), almost the only recent book in English to devote an appreciable amount of space to the Ephemeroptera. The significance of these dances is unknown. They are common among insects. Certain species of mosquito will assemble only in certain conditions, and no mating takes place unless the dance is performed. In contrast a male and female of some other species, which may be closely related, will mate at once within the confines of a test-tube. Whether dancing is always an essential preliminary to mayfly copulation has not been investigated. Many anglers are convinced that a poor season for *Ephemera* is due to the prevalence of wet and windy conditions during the period when the eggs were laid, but this is largely an armchair surmise unsupported by systematic observation. Several questions immediately pose themselves. How many days can the adults survive if they happen to emerge during unfavourable weather? What is the relation between number of eggs laid and number of adults subsequently emerging? It may be slight, for a female lays several thousand eggs, and therefore a small number could repopulate a large area. At what stage does the main mortality take place and what is the chief cause? Probably it is extremely high in the early stages, and many nymphs die because the eggs have fallen in unsuitable places. How far is overcrowding alleviated by migration of nymphs to less thickly populated areas? This is an important question, and a difficult one particularly in running water, which must be answered before

reliable figures for mortality at successive stages of one generation can be obtained. The writer once spent a night camping beside Lough Sheelin in pursuit of the nymphs of *Heptagenia fuscogrisea*. The evening was sunny but there was a cold and strong wind. On the exposed side of a wooded peninsula not a mayfly was to be seen. Under the lee of the trees the air was thick with them. What is the result of such circumstances if weather conditions remain unchanged throughout the flight period, which, in view of its brevity, must sometimes happen?

## Recording

The compilation of lists has long been an activity favoured by natural history societies, and sometimes the purpose of it has been vague. A bare list which fails to distinguish the species that abounds everywhere from the one that would not have been recorded but for the determination of some naturalist to take it within the prescribed bounds is of limited value. A list with some indication of relative abundance is better. A list with detailed descriptions of where each species was found is better still. The identification must, of course, be reliable. One collector, who, ranging far afield, misnames his captures will make nonsense of any distribution map which includes his records. To obviate this difficulty certain societies, for example the Botanical and the Conchological Societies, recognize no new record that has not been confirmed by an appointed recorder, even though the person making the capture may be the authority. It is not easy to find for a less popular group somebody who is competent to act as recorder, and who is willing to accept the view that knowledge will accrue more rapidly if he is prepared to take time off from his own work to check the collections of all and sundry. It is to be hoped that the activities of the Nature Conservancy based on Monk's Wood will put the whole question of recording on a more satisfactory basis.

Much recording has been founded on the idea that light might be thrown on the origin of the species taken. The popularity of explaining present distribution in terms of recolonization after the Ice Age fluctuates widely. Sometimes those who enjoy speculation unhindered by too many facts are widely followed. At other times they are discredited by the hard-headed pragmatic types who point out that much has happened in the last 2,000 years, let alone the 20,000 or so since the ice retreated. Britain has been largely deforested during that period and then drastically modified by industry, agriculture and drainage. Moreover, the distribution of many species is imperfectly known and the identification of some earlier records open to doubt.

In the past the distribution of species has generally been recorded by counties, or vice counties though political boundaries have little to recommend them. More valuable are records of what occurs in some uniform area. The Natural History of Wicken Fen (ed. J. Stanley Gardiner 1932. Cambridge: Bowes & Bowes) may be taken as an



illustration of this point and of several others. The village of Wicken lies some twelve miles from Cambridge and near it there is an area of fenland that escaped the drainage operations of the seventeenth and nineteenth centuries. It was one of the earliest properties to be acquired by the National Trust. After the first World War the fauna and flora were studied extensively. A future Professor of Botany laid the foundation of his reputation there and several of his students made it the subject of their Ph.D. theses. At that time, however, field work had ceased to attract professional zoologists and many of the reports on the fauna were written by amateurs, among whom one must place the undergraduates. One can sense a certain frustration in many parts of the book. The chief zoological attraction at that period was the Swallowtail Butterfly, abundant in but almost confined to Wicken Fen. Students of other groups clearly expected to find something comparable and were disappointed that their lists contained only common and widespread species. No new vistas were opened up; few contributions to general theory were possible. However, in the years that followed the writer has often noted what they took and where they took it and what they did not collect, and found it valuable when making comparison with some other relatively uniform area. The pioneer can do little more than record but his records may prove an essential platform from which advances in the future can be launched.

T. T. Macan.

## JUNIOR NEWS SECTION

I have had several letters recently from young bug-hunters who are having trouble with friends and parents who are not naturalists. I suppose all of us at some time or other have to put up with both of these threats to our enjoyment of the enthralling scientific hobby of Entomology.

Friends cannot comprehend how we get so much enjoyment out of creepy-crawlies without realizing that we have been given a real chance to become involved in the vast awe inspiring world we live in. The study of insects is an interest which could fill many lifetimes. It does not really matter if we never take up entomology as a research scientist or as a dealer in rare butterflies, entomology can still help to occupy those countless empty moments which all our lives abound in.

I have sat in the dentist's chair watching Rove beetles and tiny fruit flies on the window without really noticing that the dentist has practically disappeared inside one of my molars. When my daughter was being born I did not pace hospital floors getting lung cancer. No fear, I was watching nettle weevils and Autumn Bush-cricket nymphs in the Hospital garden weed patch. Entomology is soothing.

The big game hunter must spend a fortune and travel hundreds of miles before he can catch even a glimpse of the wonders he hopes to see. The entomologist has the world at his feet. I was tempted to give a long list of insects which can be seen commonly anywhere just to prove my point but I am sure you all know what I mean. Entomology is exciting.

Do not let your friends discourage your interest in insects, Entomology and friendship can come to terms.

Entomology and courtship are quite a different 'kettle of Silver Fish'. Probably it is advisable to put aside your nets notes and magnifying glass and to concentrate on choosing and wooing the right spouse. The selected partner need not necessarily be an entomologist but it is best to marry someone who does not mind having Dung Beetles kept in the salad bowls. My wife doesn't mind.

Some years ago I wrote some notes on how to persuade parents to stop persecuting the young entomologist. I would like to repeat some of them here.

Most people do not like being blinded by science. They are not overjoyed by being told that the creature they have given you is a rather fine specimen of *Dorcus parallellipidus* Linn. A fab Lesser Stag Beetle is much more suitable. Dad feels much happier bringing you a Black Snail-eating Beetle than an example of *Phosphuga atrata* Linn. Use scientific names to impress Dad's friends, otherwise make up a suitable English name. Such an English name gives your parents something to tell their acquaintances and also makes them feel that they would be able to understand your hobby if they really wanted to (which, as they are old (over thirty) is doubtful).

Once parents are convinced that Entomology is doing you no harm they will try to help by supplying specimens. Whatever you do, do not refer to any insect they have caught as the 'Common' something or other. They do not realize that to us Common means found everywhere, not having little value: Never use 'Common' or for that matter 'Ordinary' in any name you say to a non-entomologist adult. Substitute 'House' or 'Field' or 'British' for 'Common'.

I gave all insects English names to my parents and never called anything 'Common'. They let me keep Dung Beetles in the salad bowls.

One last point. Do not refuse specimens. Show a little enthusiasm over the rare Albino Earwing which you know is a normal one just moulted. I know many of you find it hard to give things away and find it even harder to accept things. Try to do both graciously.

The serious business of the May Quiz comes next and I have decided to give you a choice this year. You can either write and illustrate a short piece on each of the following: (i) An Oak Apple Gall Wasp; (ii) A Codling Moth; (iii) A Tiger Beetle; (iv) A typical Flea; (v) A typical Aphid; (vi) A May Fly; (vii) A Lady bird; (viii) A Crane Fly; (ix) A Lace Wing; and lastly (x) A typical Bumble Bee.

Or you can obtain your small prize (an AES badge, a single copy

of a *Bulletin* from the period 1949 up to the time you joined the Society, live stick insects (Indian, Madagascan or Corsican) or provided I can get hold of it, any specimen you are particularly after) by having a shot at the following questions. Please don't forget to include your full name and age on your entry which should reach me within three weeks of receiving your copy of the *Bulletin*.

1. What are 'Leather Jackets' and why are they of interest to the gardener?
2. What is the scientific name of the Brimstone Butterfly?
3. What is a Sheep Ked?
4. Draw and colour a larva of a Death's Head Hawk Moth.
5. What in fact are 'Wood worm'?
6. What is the function of an Insect's ocelli?
7. Describe how a Dragonfly nymph catches its dinner.
8. Draw and colour an adult Beautiful Utetheisa Moth, *Utetheisa bella* Linn.
9. What is the spectacular way in which Frog Hopper nymphs protect themselves?
10. Draw and colour the larva of a Colorado beetle.
11. What damage do Codling Moths do?
12. How long does a typical May Fly nymph live under water?
13. Draw simple diagrams of larvae of (a) an Ant; (b) a Flea; (c) a Social Wasp.
14. What do Horntail Wasp larvae feed on?
15. How does a Tiger Beetle larva catch its food?
16. Draw and colour the larva of a Seven Spot Ladybird.
17. How many species of British Butterflies are there?
18. What do the larvae of Blue Bottle Flies eat?
19. What do the larvae of Lacewings feed on?
20. What in particular would you like me to write about in future issues of the *Bulletin*.

The Nature Conservancy is now interested in records of Odonata and Orthoptera as well as Lepidoptera. If you are interested in helping please write in.

26.1.68

H. J. Berman (2971A).

### ANNUAL EXHIBITION, OCTOBER 5th, 1968

A perfect October day at our usual venue, Hugh Myddelton Secondary School, ensured a record gathering of members and friends. It was disappointing therefore that the members' exhibits, the primary objective of the meeting, were fewer than in recent years. This was particularly noticeable in the Junior section. An indifferent summer in Southern England may have been partly responsible and also some



Juniors were assisting in composite projects but nevertheless the Council feel that it is essential that Members' own contributions should be the initial interest.

Somewhat surprisingly, nothing but appreciation was received from most persons expressing an opinion. However, this was probably cloaked by the fact that practically every leading natural history dealer was present and material from all over the world was brilliantly displayed. Certainly it is convenient to restock with basic impedimenta at the close of the active year.

As usual, the Wants and Exchanges Table was well patronised and the generous donations of surplus apparatus by a number of members, provided a welcome bonus to the Society's funds. The prize for the best Junior exhibit was judged by the President.

Due to the departure of Mr Robertson for Scotland, the setting demonstration, a popular feature for many years, was not included. Although this set free a further room for refreshments, a decisive gain in that direction, this feature was badly missed. The Exhibition Secretary would welcome offers from any member willing to demonstrate setting techniques in his particular order, next year.

Hand in hand with conservation, insect photography has made vast strides in recent years and is proving a popular feature. Continually through the afternoon, Mr Cribb and his assistants showed colour slides both from members and the Society's collection and later Mr R. J. Osborne (2437) ran his interesting colour film on the life history of various hawkmoths and silkmoths.

As in previous years, we are greatly indebted to Mr B. F. Skinner and many friends for their untiring efforts which contributed so much to the success of the afternoon and also to the catering staff of the School for their efficient and pleasant service.

Members' exhibits included:—

ANDERSON, L. S. An ingenious adaption of a chart recorder to a M.V. light trap showing time and number of insects attracted.

APPLETON, D. (3631). Typical Coleoptera from S. Hampshire.

AMATEUR CONSERVATION GROUP. Convenor K. J. Wilmott. Coleoptera Section—It was emphasised that although the Lepidoptera were receiving the major publicity, many other orders were in need of protection. Photography in place of collecting was stressed.

Lepidoptera Section—Better co-operation of the many existing bodies desirable. Also means of taking quicker action, when necessary.

BARKER, L. Large colour portraits of butterflies and moths.

BEER, W. Living hawkmoths, including Death's Head (*Acherontia atropos* Linn.) of which only twelve have been reported this year.

BRUCE, C. (1746). Colour variations and aberrations of British Lepidoptera. Also interesting insects taken in 1967.

CRIBB, P. W. (2270). Butterflies from Spain and Portugal with notes on species and localities. Larvae of common moths, easily found at this time of the year.

DERBYSHIRE ENTOMOLOGICAL SOCIETY. Series and prints of Lepidoptera with the emphasis on species and local races in this county.

ELSE, G. R. (3881). Typical Lepidoptera found in S. Hampshire and Sussex.

FITZJOHN, J. R. (3707). Moths taken at M.V. light trap at Borcham Wood, Herts., during 1968.

HAWKEY, P. M. (3654J). Moths bred from sallow catkins, collected in spring.

HESLOP, J. Larvae of Marbled White Butterfly (*Melanargia galathea* Linn.) from S. Spain.

HILLIARD, R. D. (99). Moths bred from poplars in the Stanmore area over a number of years: possibly the most productive London suburban tree for Lepidoptera. Also M.V. light trap records compared for three years from the same area.

KEEN, M. Comprehensive survey of the Butterflies and Moths of Corely Hall, with notes, photographs and key to species.

LEPIDOPTERA DISTRIBUTION MAPS SCHEME. Representatives of the Scheme were present to discuss details and showed preliminary results. An extension to other orders is planned.

LEWIS, D. V. (3963J). Some interesting moths from N. Wales with notes on selected species.

LONDON ZOOLOGICAL GARDENS. As in previous years, we were pleased to welcome a Curator from the 'London Zoo' who showed a wide selection of animals and insects.

LOW, A., and GARDNER, E. Detailed collection of Orthoptera (Grasshoppers, etc.) and Phasmida.

MCCORMICK, R. F. (3375). Lepidoptera noted in an outer London garden (S.W.16) together with detailed M.V. light trap records. Also general U.K. records.

PENNEY, C. C. (3880J). Lepidoptera taken in the chalk areas around Boxhill, during 1967.

PLESTER, L. S. (2968). A fascinating collection of Finnish natural history books.

RANGER, J. (1002). Variation in the Small Tortoiseshell (*A. urticae* Dal.) and Peacock (*N. io* Kluk.) butterflies.

ROGERS, P. S. Map of localities and specimens taken in 1967 (U.K.).

SADLER, E. A. (2966). Illustrated life history of the Rosy Marsh Moth (*C. subrosea* Steph.) from its new locality in N. Wales.

SILKMOTH REARERS GROUP. General exhibit of equipment and species. Also members present to answer queries and recruit.

SKINNER, B. F. (2470). Local species of U.K. lepidoptera taken and bred in 1968.

ST. IVO NATURAL HISTORY SOCIETY. As in previous years, we were privileged to see a cross-section of the Nature studies being undertaken by this unique School Society.

TEENAGE INTERNATIONAL ENTOMOLOGY GROUP. The vigorous British section illustrated their activities. It is hoped that the financial troubles

of the U.S.A. control committee will soon be solved.

WATERS, A. P. (2615). Butterflies from Sweden and N. Germany including long series of The Map Butterfly (*A. levana* Linn.) to illustrate variation.

R. D. Hilliard (99).

### WHITE ADMIRAL IN SUSSEX

I should like to put on record the sighting of a White Admiral (*Limientis camilla* Linn.). It was seen on August 12th, 1968 in a small wood near Waldron, Sussex. This is the first time I have seen the butterfly in this locality despite close observation. It was surprising that so fresh a specimen should have been on the wing so late in the year.

P. Mobbs (3956J).

### DEATH'S HEAD HAWK MOTH IN DARLINGTON

On the night of the 11th-12th September 1968 I took a Death's Head Hawkmoth (*Acherontia atropos* Linn.) in a Robinson light-trap in Low Coniscliffe near Darlington, Co. Durham. The moth had a wingspan of 12cm and was in perfect condition. I should be interested to hear of other records of this species taken previously in the same area.

R. P. Eaton (3926).

### CONSERVATION GROUP

Takeovers and mergers are now the thing, so no less with conservation; the AES Conservation Group has united with the Coleoptera Conservation Group of the TIEG. The Coleoptera Section will be run by David Lonsdale of Southampton University, who specialises in *Hydrophilus piceus* Linn.; this beetle needs all our help in order to survive and prevent the species from becoming extinct in Britain.

All enquiries about the group should be addressed to the Secretary, AES. Conservation Group, 33a Willows Park, Maidenhead Road, Windsor, Berks.



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AUGUST, 1969



# THE BULLETIN OF THE AMATEUR ENTOMOLOGISTS' SOCIETY

World List abbreviation : Bull. amat. Ent. Soc.

EDITED by DAVID CORKE, B.Sc.,  
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## ANNUAL EXHIBITION 1969

The Annual Exhibition will be held on 27th September, 1969 at the Holland Park School, W.8. Full details of how to reach the school, etc., are given on the back cover.

The following further notes may be of assistance to those intending to visit the exhibition.

**Exhibits** are not confined to specimens captured this season: an item need not be new to be of interest. Any exhibit related to entomology in its broadest sense (and nature study) may be shown. This includes not only set specimens, livestock and apparatus, but also the illustration of techniques, records and observations with or without specimens of the species concerned, etc. A covering for set specimens is advisable—a piece of “polyglaze” or similar material may be used as a transparent cover to protect storebox specimens, for instance. Exhibits from non-Members and Members of affiliated societies are welcomed.

**Good labelling** of exhibits is essential, as the value of an exhibit often lies in the explanation of what the material displayed represents. The name of the exhibitor should be added as this allows not only contact to be made between the exhibitor and people particularly interested in the exhibit, but also allows a note of the exhibit to appear in the exhibition report in the *Bulletin*, so that Members who are unable to visit the exhibition are aware of some of the special interests of other Members.

**Juniors' prize:** There will be a special prize for the best Junior Member's exhibit (a “Junior Member” is one who was eligible to pay the Junior subscription for this year). Group exhibits are allowed, and in the event of such an exhibit winning, the prize will be shared equally between the members of the group. Exhibits will be judged by the President. The method of presentation in relation to the subject will be the chief criterion used in judging the exhibits—it is therefore not necessary to exhibit large numbers of specimens, or species which are rare, to win the prize. Age will also be taken into account.

**Colour slides** from the Society's collection will be shown throughout the afternoon, and Members are invited to bring along interesting slides of their own to show other Members.

**Dealers:** At AES Exhibitions it is no exaggeration to say that nearly every entomological supplier in the country is always represented, and this will be equally true of this year.

**Bring an exhibit, large or small**





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**EDITORIAL**

It is good to see that an active Conservation Group is emerging in the AES (see the report by Mr Parker in this issue). This coupled with the establishment of a new society devoted to the conservation of British butterflies indicates clearly that, at last, entomologists are waking up to their responsibilities. Ornithologists have for years been demonstrating that it is possible to study and enjoy a group of animals without killing them, and the RSPB is one of the most active conservation bodies. For too long there has been a tendency for entomologists to "catch it, kill it and name it" with never a thought to the possibility of studying insects alive and in the wild. At last this trend seems to be reversing.

However, despite the improvement in entomologists' attitudes towards conservation, all is not well with the Conservation movement in Britain. Private individuals within the Council for Nature have put forward proposals that this body should amalgamate with the Society for Promotion of Nature Reserves (the guardian angel for the County Naturalists' Trusts) and the RSPB. If this comes about a really powerful society will result—one which can promote the purchase and conservation of nature reserves throughout Britain, as well as encouraging the government to take more interest in conservation.

But the Council for Nature is ailing and may die before the amalgamation can be agreed. The RSPB may direct any new body too much towards the exclusive interest of birds. What can we, as entomologists, do? Well firstly we should all join our local County Trust—at the moment these bodies do more than any other for conservation in Britain. All of them need the entomological knowledge which you can provide, as well as any time or money you have to spare. Secondly as soon as a truly national society for all conservation interests is established join this too.

I shall be abroad for part of the Summer and this will result in a delay to the November *Bulletin* and in answering letters. Please accept my apologies in advance.

The Society is always pleased to receive the publications of affiliated societies. One especially praise-worthy effort is 'Heritage', a duplicated, quarterly bulletin of the Loughborough Naturalists' Club. Information on this club can be obtained from Miss B. Booton, 58 Groby Lane, Newtown Linford, Leicestershire.

David Corke (2962).

## COLLECTING NOTES—AUGUST 1969

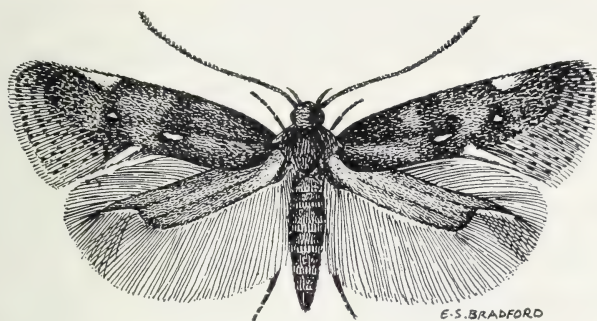
## The Smaller Moths

This article deals with some of the leaf-miners, other than Lithocolletidae and Nepticulidae, which afford interesting autumn work for the microlepidopterist. Mr Bradford has depicted two: of *Microsetia stipella* Hübn. he writes as follows: 'The cocoon of this moth was taken from a rustic pole in the garden at the base of which there were plants of *Chenopodium* spp. on which the larva had probably fed. *Atriplex patula* Linn. also grows wild in the garden and possibly there are two species of *Chenopodium*: most of my specimens have come from the garden the end third of which is on the wild side. The larvae make whitish blotches in the leaves of *Chenopodium* and *Atriplex* and can be found in June and again in September and October. The adult moth is on the wing in May and June and again in August.

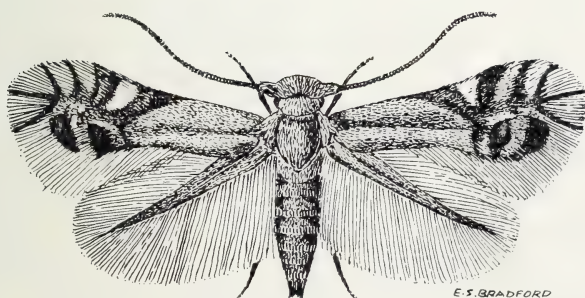
'The forewings are mainly dark grey. In some specimens they have more of a bluey-purple look. There are two triangular yellowish spots, one near the end of the costa and the other in the tornal angle. There are two more spots in the disc and on the fold surrounded by blacker scales.'

There is considerable variation in the size of the yellow spots, and in some specimens the whole dorsum is suffused with yellow. *M. stipella* is a common moth, especially near the coast, and is easy to breed. In captivity the larvae spin up in sheets of tissue, and, if the pupae are brought indoors into a warm room in February, the moths will soon begin to emerge. While searching for their white mines in the autumn, keep a look out for greenish mines containing crimson spotted larvae: these are *M. hermannella* Fab. Unlike their cousins, these larvae seem reluctant to change to fresh leaves as their food withers and I lost those I collected when they were small. However, nearly full-fed larvae taken a little later from the same place gave no trouble and yielded imagines early in the year when accorded the same treatment as *M. stipella*. With its black, orange and metallic coloration, *M. hermannella* is one of the most beautiful of the Gelechiids.

The second moth Mr Bradford has drawn is the tiny *Leucoptera scitella* Zell. Of this he writes: 'I have only found this little moth in one area to date. It is not far from where I live in Hertfordshire and consists of a clipped hawthorn hedge (*Crataegus* sp.) containing a couple of elder trees (*Sambucus nigra* Linn.) and various plants at the base. The hedge is about two hundred feet long and is inside an iron railing. In the autumn I collected a number of leaves of the hawthorn that had well developed spiral blotches in them, and larvae therein. It is best to collect the leaves when the blotch is about three-eighths to half an inch in diameter; by then the larvae are almost fully developed. If the leaves are collected earlier, there is a danger of drying out and the larvae



*Microsetia stipella* Hübn. (Wing span 8-10mm)



*Leucoptera scitella* Zell. (Wing span 7-8mm)

lying. The leaves were put in a seed-box with an inch of earth at the bottom, left out in the open under cover and watered occasionally during the winter. The adult moths emerged in June.

'The forewings from the base to about half-way are a dull leaden colour with a hint of blue-grey, while the apical half is partly orange. The post-tornal spot is a lovely violet-gold colour with a blackish area each side. The bar preceding this and the two bars from the costa are orange edged with brown-grey, the costal bars being separated by a whitish streak. The terminal bars are blackish, the penultimate one being more or less horizontal with the wing.' (This serves to distinguish



*L. scitella* from its close relative *L. lotella* Staint. which has the equivalent bar directed upwards.) 'The hindwings are brownish grey.'

Apple (*Malus* spp.) and Rowan (*Sorbus aucuparia* Linn.) are also the food-plants of this larva. An interesting character of the adult which is shown clearly in Mr Bradford's drawing, is the thickened scape at the base of the antenna which forms a kind of eye-cap. This is a usual feature of this family (the Lyonetidae) and also occurs in the Nepticulidae.

Another Gelechiid larva to be found in the autumn is *Scrobipalpa acuminatella* Sirc. which makes brownish blotches in the leaves of thistles (*Carduus* and *Cirsium* spp.); I have generally found it on the larger, softer rosette leaves which rest on the ground. In the wild this species emerges in late April; so this, too, is an easy moth to force.

The larvae of the next two species feed in the early autumn and their moths emerge in October and then overwinter. The first is *Acrolepia pygmaeana* Haw. which makes white blotches in the leaves of Woody Nightshade (*Solanum dulcamara* Linn.) and then pupates in an open network cocoon which resembles in texture a nylon stocking seen under magnification. The termination '-ana' of its specific name shows that Haworth supposed it to be a Tortricid—a natural enough mistake to make on first acquaintance from the general appearance of the moth. The other, called *Bedellia somnulentella* Zell., belongs to the small family of the Tischeriidae. I do not know whether it gets its name from its long winter sleep or its dusky coloration, though it makes up for its drab hues by the grace of its outline. The larvae mine leaves of *Convolvulus* making conspicuous white blotches (they eject their frass) and readily transferring to fresh leaves. When the time comes for pupation, they construct slender hammocks in which to effect their transformation. The larvae are erratic in their appearance: they swarmed at Stanford-le-Hope in south Essex in early October, 1967, though in many years I have been hard put to it to find half a dozen.

Three other members of the Tischeriidae conclude this selection of autumn leaf-miners. *Tischeria complanella* Hübn. and *T. dodonaea* Heyd. make blotches on the upper surface of oak-leaves, the former white and the latter (a rarity I have yet to encounter) brown. *T. complanella* constructs a neat, round cocoon inside its mine, clearly visible against the light, and in this cocoon it overwinters, pupating in the spring. The third species, *T. angusticolella* Dup. is very local but common enough in some places where it occurs, as in localities like the Thames estuary. The larvae make blotch mines in the leaves of *Rosa* spp., often low down, causing them to fold upwards. The leaves should be picked about the end of October and, to avoid desiccation, put in a flower-pot a quarter filled with earth; some nylon tied over the top will keep out unwelcome visitors. The pot should be left out of doors in the shade at least until Christmas and watered if there is insufficient rain. After pupation they may be brought into an outhouse. I have not tried forcing this species, but it would probably be successful.

A. M. Emmet (1379).

**Hymenoptera Aculeata**

Mr. J. C. Felton regrets that due to ill health he has been unable to continue this series in the May *Bulletin* and in this issue. He hopes to continue the notes in the November issue.

●

**MANIOLA JURTINA (Linn.) (the Meadow Brown Butterfly)  
AND ITS FORMS**

After some ten years' work on *Maniola jurtina* (The Meadow Brown Butterfly) I published a paper in the Entomologist's Record Vol. 81. As a number of AES members helped in some way with the preparation of this work I thought it would be of interest to publish a summary of the information that it contained in a form which would be suitable for the *Bulletin*. I have omitted all synonyms in the hope that if anyone cares to find out more about this interesting species he will get the necessary information from the 'Record'.

*Maniola jurtina* (Linn.) (*Maniola* Schrank, 1801—Type: *jurtina* (Linn.))

**Distribution.** Europe (rare north of 62° in Sweden), the Canary Islands, Africa north of the Atlas Mountains, most of the Western and Central Mediterranean Islands to Western Siberia and North Persia. Abundant in most of Central Europe up to about 4000 feet. It becomes much more local in the north-west of Scotland and, in the south, it is missing from large areas of the Alps and the interior of the Iberian Peninsula. In Portugal and the Mediterranean Islands it becomes a shade-loving insect, becoming rarer as one goes eastward.

**Flight Period.** In Central Europe, early June–September, but in north Scotland and Scandinavia it does not appear until early July and flies until the end of August. In Southern Europe it flies from May until October but in the Canaries and Malta the flight period is from April until November.

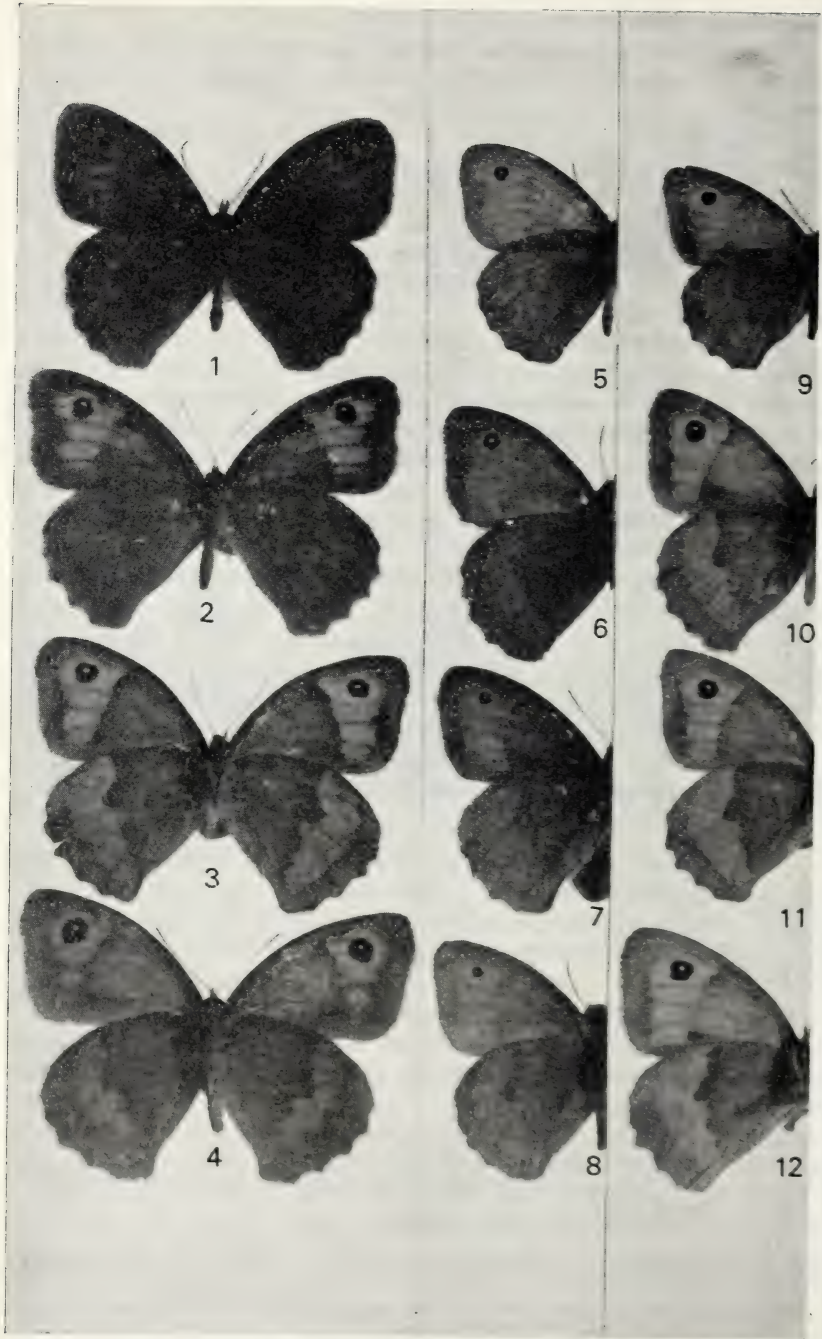
**Forms.** The term 'form' has been used to cover all types of variation below sub-species. The system used by Leeds (1950) has complicated matters somewhat and his names have been used only where they refer to forms not already described.

**A. Size**

- f. *nana* Stephen 1923—a dwarf.
- f. (? race) *parvula* Stauder 1915—a dwarf race of *hispulla* Esp. from Monte Faito and S. Angelo (Sorrento).
- f. *major* Leeds 1950—strikingly large specimens.

**B. Albinism**

- f. *brigitta* Ljunch 1799—an albino in which the wings in part are wholly turned to white or very pale.
- f. *cinerea* Cosm. 1892—albinos with scaling on the wings which leaves them pale metallic, ashy or greasy in appearance.
- f. *subtis-albida* Silbernagel, 1943—has the underside forewings very pale through which shines the upperside markings.





*pallens* Th.-Meig., 1889—has the apical patch abnormally pale or white.  
 ♀ *semi-intermedia* Lempke, 1935—has only part of the apical patch very light or white.

### Variation in Ground Colour

- ♂ *nigro-rubra* Lmbl., 1903—ground colour blackish brown (*Erebia*-like) with reddish brown apical patch.  
 ♀ *nigrianira* Forsyth-Johnstone, 1941—has the upperside forewings greyish-brown with the fulvous patch very much reduced. Hindwings similar. Margins and transverse band on the underside much extended and very dark.  
 ♀ *huenei* Krul., 1908—has the fulvous area darkened because of a dusting of dark scales (ground colour).  
 ♀ *antiultrafulvescens* Leeds, 1950—has the basal part of the underside forewings distinctly darkened—sometimes reddish.  
 ♀ *concolorata* Thomson, 1969—has the area between the transverse medial band of the underside forewings of the very same dark colour as the upperside.  
 ♂ *suffusa* Tutt, 1896—a male without fulvous on the upperside.  
 ♂ *hertha* Heinrich, 1909—has a band of fulvous on the forewings.  
 ♀ *feminea* Graves, 1930—is a male with fulvous on the hindwings.  
 ♀ *pseudomas* Ckll., 1889—has only male marking.  
 ♀ *rufocincta* Fuchs, 1900—is a female with fulvous on the hindwings.  
 ♀ *nuragiformis* Vrt., 1916—has very much extended fulvous resembling *Maniola nurag* Ghil.  
 ♀ *tithoniformis* Vrt., 1916—has three characters further developed together with very large apical eye-spots.  
 ♀ *antifulva* Lempke, 1957—has the fulvous extended on the forewings only.

### Variation in the Apical Eyespot

- anommata* Vrt., 1904—has no apical eyespot.  
*antiparvipuncta* Leeds, 1950—has the apical eyespot greatly reduced.  
*anticrassipuncta* Leeds, 1950—has the apical eyespot greatly enlarged.  
*caeca* Rebel, 1910—has no white 'pupil'.  
*erymanthoides* Strand, 1919—apical eyespot split by the ground colour.  
*bioculata* Rebel, 1910—two 'pupils' in the eyespot.  
*addenda* Mousley, 1903—has from 1-4 additional spots behind the apical eyespot or towards the apex.  
*erymanthea* Esp., 1783—combines *addenda* and *ocellata*.  
*subhispulla* Strand, 1912—combines *erymanthoides* and *rufocincta* with *huenei* colouring.  
*postexcessa* Leeds, 1950—has one or more spots on the upperside hindwings.

### Spotting on the Underside Hindwings

- ocellata* Tutt., 1908—has one or more white pupilled black spots on the underside hindwings.  
*biocellata* Tutt., 1910—combines *ocellata* and *antiparvipuncta*.  
*infra-impunctata* Lempke, 1935—has no black spots on the underside hindwings.

### Other Hindwing Variation

- grisea* Tutt, 1896—has the band on the underside hindwings of a pale grey colour.  
*violacea* Wheeler, 1903—has this band 'heliotrope'.  
*luigionii* Rost., 1908—is a male with a greyish yellow band.  
*fracta* Zweigelt, 1918—has the light band interrupted in cell IV by a dark bar.  
*rectoformis* Thomson, 1969—underside forewing light subapical band crossed by a bar of the same dark colour as the margins and the medial transverse line.

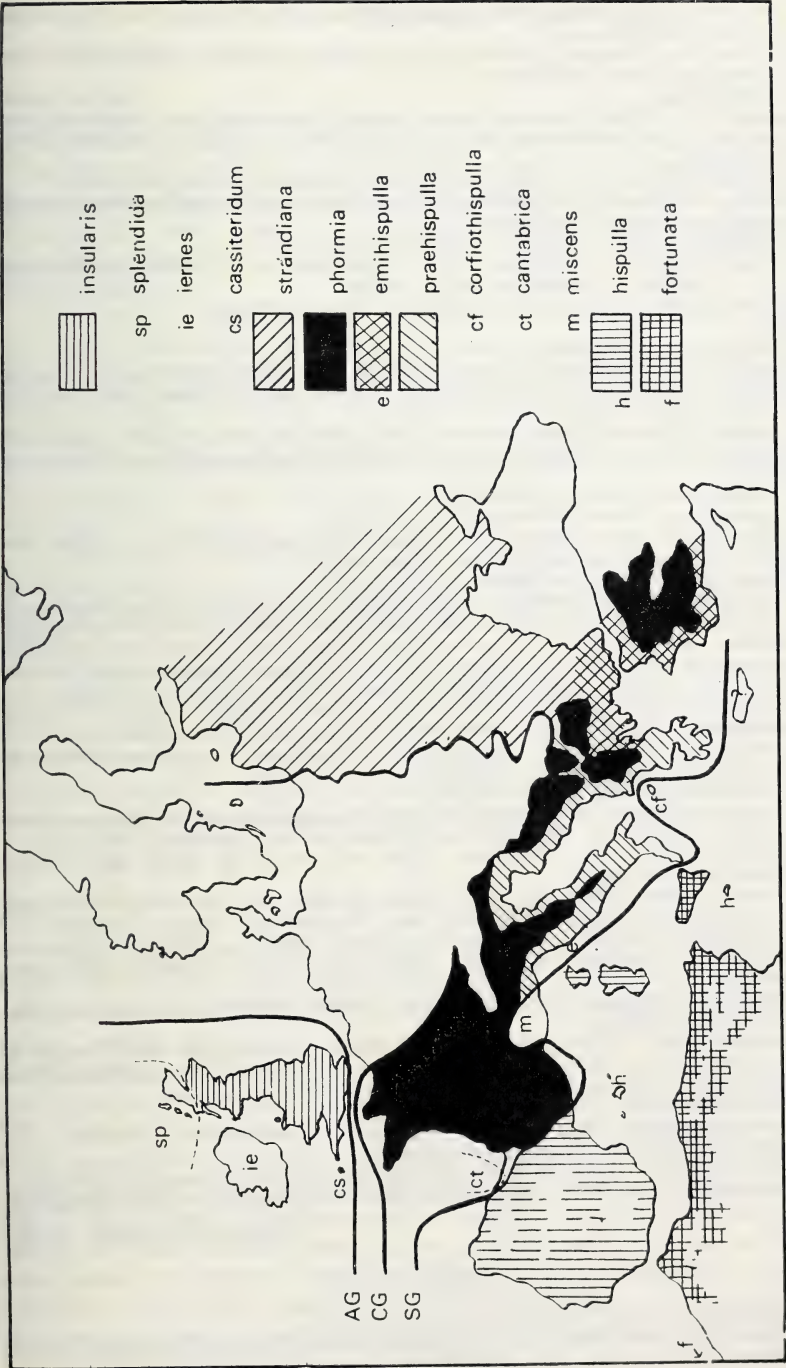
### Explanation of the plate

- fig. 1 *Maniola jurtina insularis* Thomson ♂ upperside type.  
 fig. 2 *M. jurtina insularis* ♀ upperside allotype.  
 fig. 3 *M. jurtina insularis* f. *concolorata* ♀ underside.  
 fig. 4 *M. jurtina insularis* f. *rectoformis* ♀ underside.  
 fig. 5 *M. jurtina jurtina* (L.) ♂ underside.  
 figs. 6-8 *M. jurtina insularis* ♂ underside paratypes.  
 fig. 9 *M. jurtina jurtina* ♀ underside.  
 figs. 10-12 *M. jurtina insularis* ♀ underside paratypes.

Map 2. Great Britain showing the January and July isotherms.



Map 1. The distribution of the sub-species *splendida* Buchanan-White of *Maniola jurtina* (L.) showing its cline with *insularis* Thomson.



Map 3. Europe showing the distribution and range of the Atlantic (AG), Central European (CG) and Southern races of *Maniola jurtina* (L.).



Hindwings with very narrow light band which does not reach the inner margin but stops before vein 2.

- f. *infrareticulata* Lempke, 1957—has the underside handwings unicolourous grey dusted with small dark stripe.

### G. Other Forms

- f. *pauper* Vrtý., 1916—forewings rather pointed, hindwings as in *costa-cava*, eyespot as in *anti-parvipuncta* and *addenda* together with much reduced fulvous colouring.

- f. *costa-cava* Cabeau, 1904—has the hindwings indented between the veins.

- f. *latimargo* Peerdeman, 1962—marginal band on the underside forewing distinctly broadened at the inner angle.

- f. *brevipennis* Lempke, 1957—all wings 'too short'.

Homeosis: Occasional specimens occur which have on the underside hindwings streaks or patches of fulvous scaling.

Gynandromorphs: These are extremely rare but not unknown.

### Races

#### A. The Typical Sub-species

- jurtina* (L.) 1758—Sweden, Norway, Finland, Denmark, Netherlands, Belgium, North Germany and, as far as present papers suggest, Hungary and Moravia.

#### B. The Atlantic Group

- ssp. *insularis* Thomson, 1969—England apart from the Isles of Scilly, South and Central Scotland forming a cline with *splendida* to the north and *iernes* to the west.

- ssp. *iernes* Graves, 1930—all of Ireland.

- ssp. *cassiteridum* Graves, 1930—the Isles of Scilly.

- ssp. *splendida* Buchanan-White, 1871—North-West Scotland forming a long cline with *insularis* to the east and south (see map 1).

#### C. The Central European Group

- ssp. *phormia* Fruh., 1909—France to Normandy in the north to the Pyrenees in the south, the uplands of north and central Italy and the hills of the Balkans, Greece and Asia Minor. Also the Tyrol from which the race was described.

- ssp. *strandiana* Obratzov, 1936—Eastern Russia, Crimea, Bessarabia and Podolia.

- ssp. *praehispulla* Vrtý., 1919—the lower slopes of the mountains of Greece to a transition with *emihispulla* in the north (Olympia), probably most of lowland Yugoslavia and all of Italy except the mountains and the far north.

- ssp. *emihispulla* Vrtý., 1919—Elba and the lowlands of Asia Minor (west) and the Balkan States south to Thessalonika and Olympia.

- ssp. *corfiothispulla* Graves, 1933—Corfu.

- ssp. *cantabrica* Agenjo, 1934—described from Camargo (Santander) but comprises a fair proportion of the *jurtina* to the north of the Cantabrian Mountains.

- ssp. *miscens* Vrtý., 1953—Maritime Alps and much of south east France. Described from Nice.

- ssp. *hispulla* Esper, 1805—Spain to Catalonia and the Cantabrian Mountains, Portugal (type locality), Majorca and the Balearic Islands, Sardinia and probably also Corsica. The form from Malta, though applicable to this race, approaches *fortunata* in some respects more than *hispulla* from other localities.

- ssp. *fortunata* Alpheraky, 1889—the Canary Islands, Palaearctic Africa and Sicily.

#### E. The Eastern Group

- ssp. *megela* Obthr., 1909—Described from Akbes. Graves gives Shar Deresy on the Turco-Syrian borderland as a locality and suggests that specimens from Marmarice in the south west of Asia Minor belong to this race.

- ssp. *maraschi* Pfeiffer, 1932—Marasch.

- ssp. *telmessiaeformis* Vrtý., 1919—very difficult to ascertain, but is found in the part of Asia Minor lying opposite Cyprus.

- ssp. *persica* Le Cerf, 1912—Iran Plateau and the Western Mountains of Persia.

- ssp. *ghilanica* Le Cerf, 1913—the wooded regions on the shores of the Caspian sea.

9.3.69

George Thompson (3689).

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THOMPSON, G. (1968) *Maniola (Epinephele) jurtina* (L.) (Lep. Satyridae) and its Forms. *Ent. Rec.* **81**: 7-14, 51-8, 83-94.

## LEAFHOPPERS (AUCHENORHYNCHA)

### Introduction

The sucking insects or Hemiptera fall into three main groups, the Heteroptera (plant-bugs), the Auchenorhyncha (leaf-hoppers and their allies) and the Sternorhyncha (of which the largest number are Aphids). Most of the latter group are soft-bodied and can only be preserved in a spirit collection, so that the other two sections are more attractive to the amateur.

The British Auchenorhyncha number about 350 British species and they can be found on nearly all kinds of vegetation in greater or lesser numbers. Their fore wings (often called 'hemelytra' or 'tegmina', which become 'hemelytron' or 'tegmen' respectively in the singular) are more or less membranous, but of similar texture throughout, in contrast to the Heteroptera, where there is a clearcut distinction between the membrane (roughly the apical third of the fore wing) and the coriaceous basal part.

The name 'Auchenorhyncha' is derived from two Greek words, signifying that the rostrum (the sucking beak) is attached to the neck, while in the Sternorhyncha the rostrum is apparently attached to the chest.

The Auchenorhyncha have been very much a neglected group in this country—so much so that I felt that I was occupying a vacant ecological niche when I started taking a serious interest in them about fifteen years ago! However, interest has increased also in many European countries in the past twenty years or so and some of the more exciting work mentioned below originated on the Continent.

### Song

Those who have been in warmer climes—e.g. on a Mediterranean holiday at the right time of the year—will be familiar with the monotonous and regular song of the Cicadas, even if they have not seen the insects, which are not as obvious to the eyes as to the ears. These spend several years (one American species has a life-span of seventeen years!) as a root-feeding larva (some writers prefer the word 'nymph' for these and other terrestrial insects with incomplete metamorphosis) living underground and have front legs modified for digging. Unfortunately, the only British member of this family, *Cicadetta montana* Scop. (fig. 1) is extremely local in the New Forest and, should you be lucky enough to find it there, please do *not* gleefully bring back a series for your cabinet or you may help it to follow the fate of the Large Copper butterfly! I may add that it has a very high-pitched song which not everyone can hear—I was once played a tape-recording (made by Dr J. A. Grant) which to me was quite inaudible.

It was not realized until about twenty years ago that the rest of the Auchenorrhyncha also produced songs by a similar drumming action, using essentially membranes stretched across two cavities at the base of the abdomen operated by muscular control. This was the subject of a wonderfully detailed and painstaking account by Ossiannilsson (1949). In the case of the smaller species they have to be held close to the ear or amplification used to hear the songs.

Evidence is now building up that the calls which the male uses to attract the female are often widely different in species which are very similar in general appearance: this suggests that these may be generally the pre-mating isolating mechanisms that tend to prevent closely allied species from hybridization. In this connection, Strübing (1963) has recorded the mating calls of two species of *Euscelis* and of the hybrids between them produced in the laboratory; the latter had an intermediate song, which in fact aroused females of either parent species. However, when the first generation hybrids were crossed with either parent, the chances of survival of the second generation proved much reduced.

I know of two independent workers in Britain investigating this aspect of behaviour of Auchenorrhyncha, but much remains to be learned. This topic could be of special interest to anyone interested in acoustics and sound-reproduction techniques.

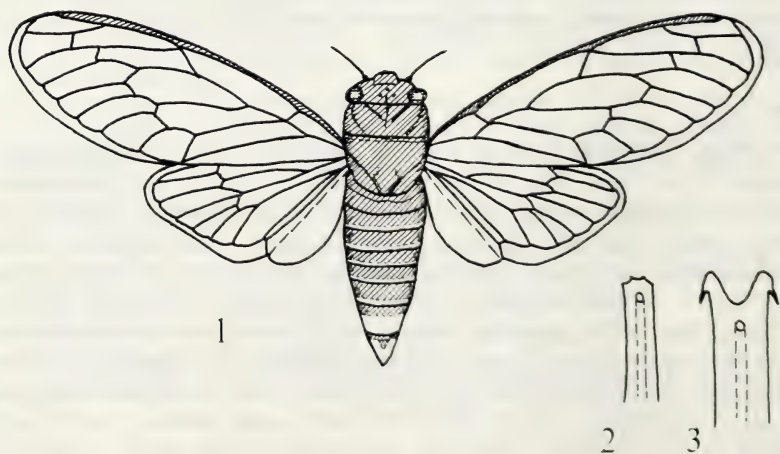


Fig. 1 *Cicadetta montana*.

Figs. 2 and 3 Aedeagus of *Euscelis incisus*: (2) spring generation; (3) summer generation.



## Mounting

Most of the species in this group are small and about twenty per cent can only be determined with certainty by dissection of the males; in some of these cases females cannot be identified at species level. In general, it is often also necessary to use 'underside' characters (such as the shape of the seventh abdominal sternum of the female) to name specimens. For this reason I prefer to impale them with a micro-pin and to stage onto polyporus. If I require to move a leg or a wing or to remove the abdomen, I find a drop of 70% alcohol, applied locally with a brush, relaxes the part sufficiently to move it after a few seconds.

As mentioned above, males quite often have to be dissected, the form of the internal male genitalia providing the best characters. This is of course most easily done under a binocular microscope. For this, I have a dozen small tubes of 10% potassium hydroxide (caustic potash) solution in a small rack, the holes of which are numbered from 1 to 12, and at the end of the row a tube of glacial acetic acid. I remove the abdomens from up to twelve specimens one evening and put them into the potassium hydroxide. A day or two later I can transfer each in turn to the acetic acid and thence after a few minutes into a drop of clove oil on a slide for dissection. The latter is performed using two micro-pins, the blunt end of each of which has been pushed into the end of a separate matchstick with a pair of forceps.

## Taxonomic characters

Much reliance has been put on male genitalia for the last half century or so for distinguishing between closely related species, but it is only in recent years that some more discerning workers have stopped to ask how much variation could normally occur within a species. For instance, Knight (1968) has figured the aedeagus (the central organ, sometimes given another name by analogy with that of *Homo sapiens* Linn.) of a number of specimens of each of several species of *Dikraneura*.

Müller (1954) has, in particular, studied the most interesting case of the species *Euscelis incisus* Kirschbaum (generally known as *E. plebejus* Fall., but the name unfortunately has to be changed to accord with the International Code). In this case, there are two and occasionally three generations in the year, the spring and summer generations differing markedly: not only is the earlier generation smaller and darker, but the aedeagus is completely different in form (figs. 2 and 3). Müller bred this insect and showed convincingly that the length of the periods of illumination and darkness during the day for some of the larval stages triggered off the production of these various forms. In an allied species, *Euscelis lineolatus* Brullé, Müller (1957) reported that a form with a much more developed aedeagus appeared if a temperature over 27°C was maintained during some larval instars, but this has not

occurred in Britain and seems unlikely to do so!

It has, however, been recognized for quite a while that parasites, such as Dryinids and Pipunculids, could cause these and other abdominal organs to be deformed. Dryinids are small wasps which parasitize leafhoppers, the larvae feeding inside the host, internally at first and later forming a black or brownish sac protruding from the abdomen, the neck, or other parts. These sacs may be found on adults of small leaf-hoppers, such as the Typhlocybinae, and on larvae of larger Auchenorrhyncha. The Pipunculids are small two-winged flies, which also feed inside the abdomen of the host and may distort it in the later stages of their growth. The parasite-host relationship between most of these (and also the Strepsiptera mentioned below) has been little studied and would certainly be a rewarding field.

The rather complex structure of the male genitalia in many species of these and other insects have led to speculations that they have a function somewhat like a key, with a corresponding lock-like structure of the female genitalia. Unfortunately, this elegant hypothesis has not been borne out by studies of the latter organs. Although in some groups the shape of the seventh abdominal sternum or of the gonoplas has considerable diagnostic value, in other cases groups of females of closely related species cannot yet be distinguished by taxonomists—except, presumably (for this has not as far as I know been tried), by their reactions to singing males of the different species! Nevertheless, females can almost always be allocated easily to the right genus even with the more narrowly defined genera mainly used today.

In such cases, females found in company with males of only one of the possible species can be given a name with a fair degree of certainty. An even greater degree of probability can be given to pairs captured united: sometimes after transfer to the killing tube, they even die in this happy state, like Francesca and Paolo (Dante Alighieri, about 1310).

Ossiannilsson, following on his work on the mating calls of the leaf-hoppers, pointed out (1951) that in males the form of the sternal apodemes to which the muscles of the singing apparatus were attached offered good taxonomic characters at specific level in *Macrosteles*. Since then species which are not clearly distinct on the basis of the male genitalia have been recognized using this character, in both the above genus and in *Kybos*.

There are a number of taxonomic problems in this group which could only be studied by careful experiment and I have discussed two of these in some detail in another paper (1965). It is clearly significant that dark forms of *Neophilaenus lineatus* Linn. only occur in some types of habitat within the wide range of these which it inhabits, but it is not so clear what it signifies! This problem will probably only be settled by breeding experiments, although a suggestion has since been made to me that dark forms may occur in areas recently associated with heath fires: this hypothesis could be checked by careful observa-

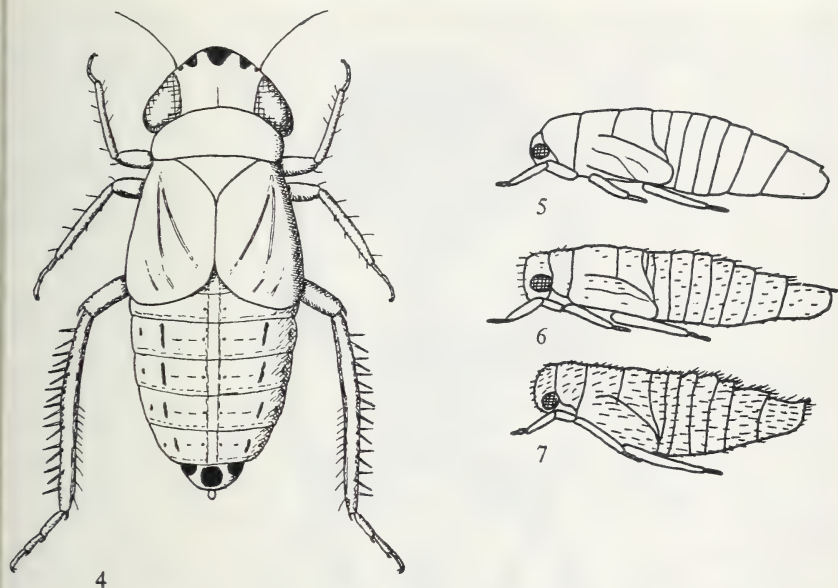


Fig. 4 *Doratura stylata*.

Figs. 5 to 7 Last instar larvae of *Macropsis* species: (5) *M. marginata*; (6) *M. albae*; (7) *M. prasina*.

tions. Again, many species of the *Edwardsiana* subgenus have been described as differing from others only in details of structure of the male aedeagus. However, in some cases where more than one form occurs in a single habitat, breeding experiments may show these to be only genetically controlled variants within a single species.

The variation in British examples of the normally short-winged *Doratura stylata* Boheman (fig. 4) mentioned in another paper (Le Quesne, 1964) may also be dependent on the conditions under which they develop and would make another interesting subject for breeding experiments.

### Life histories

Very little is known about the life-histories of most of the British species of leaf-hoppers or about their ecology. There is a need for the larval stages of many to be accurately described and bred through so that they can be determined with certainty. Sometimes the habits of larvae and adult are different, though both are essentially adapted for feeding in the same manner. In one group of closely related species, at least (*Macropsis marginata* H-S., *M. albae* Wag., and *M. prasina* Boheman) the larvae are much more easily distinguished than the adults (figs. 5-7).



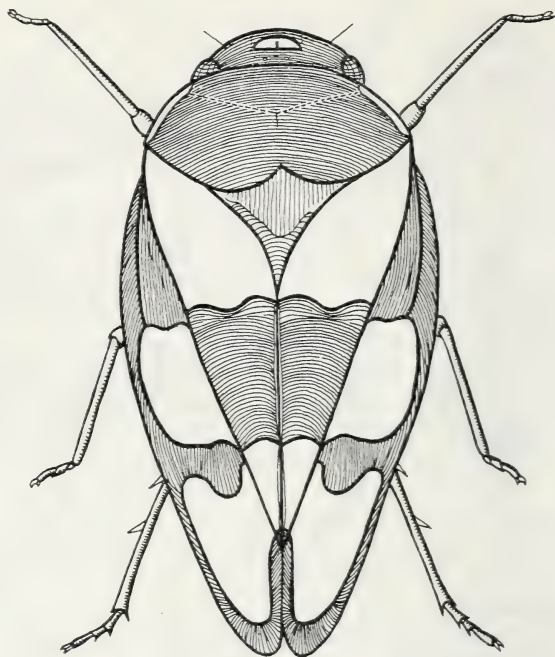


Fig. 8 *Cercopsis vulnerata*

Larvae of *Cercopsis vulnerata* Ill., which as an adult is a conspicuous red and black insect (fig. 8), live gregariously in a solidified mass of froth underground, while the subterranean larva of *Cicadetta montana* has been mentioned earlier. The habits of larvae of *Philaenus spumarius* Linn., the cuckoo-spit insect, and its allies are well known, but the adults do not produce froth. (Incidentally, very little seems to be reliably known about the chemical nature of this froth.) Moreover, adults of *P. spumarius* show a very wide range of variation in colour-pattern from entirely straw-coloured to wholly black! As these are numerous and rather conspicuous insects, a great deal has been written on this topic, but the first successful experiments in breeding through from a number of mated pairs have only recently been described (Halkka *et al.*, 1966): the difficult stage is overwintering as the egg, where humidity appears to be critical. These experiments will help to prove the real genetic relationships, but Whittaker (1968) has done some field experiments suggesting that the nature of the foodplant of this frog-hopper (which is most catholic in its tastes) may also have some effect on the colour-pattern.

The larvae of Cicadellids feed in the open, like the adults, but the early stages of some, like *Allygus mixtus* Fab. and *A. modestus* Fieber, feed on grasses, while the adults are usually captured on trees. Some larvae, like that of *Mocycdia crocea* H-S., which is yellow with two bold longitudinal black stripes, are very characteristic, though bearing little resemblance to the adult. In the birch-feeding *Oncopsis flavicollis* Linn., where the female has a number of strikingly different colour-forms, larvae also exhibit corresponding differences in appearance, which have not yet, as far as I know, been thoroughly studied.

In the Delphacids, larvae usually have similar habits to the adults and are sometimes parasitized by Strepsiptera ('Stylopids'). Larvae of a few Delphacid species have been described by Hassan (1939)—and Vilbaste (1968) has very recently published a paper giving keys to larvae of a number of species—but it would be useful to have this knowledge extended. The larvae of Cixiids are more retiring in their habits: I have bred *Cixius pilosus* Olivier adults from larvae found just above ground level at the base of grasses and Woodroffe (1962) has found *C. cambricus* China larvae in wax-lined cells surrounding sedge roots under stones on sandy, damp terraces on a mountain-side. I have also found larvae in moss in various places which I suspect to be *C. nervosus* Linn., but have not had the opportunity to breed them through.

## Ecology

There are a great many ecological problems that could be solved merely by careful observation. For instance, almost all the species of the subfamily Deltocephalinae and of the family Delphacidae (which between them comprise almost half the number of British leaf-hopper species) feed on grasses. However, in a very few cases do we know which grasses are the foodplants and also which insects feed fastidiously on a single grass species and which nonchalantly on a wide range of them. It is, however, quite feasible that the common habit of defining the habitat of species 'A' as 'chalk hillside' and of species 'B' as 'peaty marshland', etc., may not so much reflect the preferred habitats of their respective foodplants as the humidity and temperature conditions of the micro-habitat preferred by each insect. It is, of course, always possible that the acidity or alkalinity of the soil may cause the sap of the same species of grass, growing in different situations, to have differences in pH which could make it preferred or rejected by a given insect. Similar considerations could apply to trace metals or other soil components.

In some groups, and especially among the Delphacids, one can get macropterous (fully-winged) and brachypterous (short-winged) forms of the same insect. It has been suggested to me (C. A. W. Duffield, personal communication) in the case of one Delphacid, *Conomelus anceps* Germar, that macropterous forms are more numerous in alternate

years and it is certainly a matter of common observation that in some years macropters are considerably more numerous than in others—they are, of course, advantageous for the dispersal of the insect to help it to colonize new habitats readily. It is quite possible that differences in temperature and humidity during the larval stages may be the critical factor here. Even if one is not equipped to conduct breeding experiments under artificial conditions, field observations coupled with careful records of temperature and humidity, preferably though not necessarily at the levels above the ground at which the insect lives, during a number of seasons might give useful indications as to the mechanisms inducing the development of the differently winged forms.

Other interesting ecological problems arise from the levels at which different species live, which is evidenced by the differences between the samples collected in a given area by sweeping or by grovelling and searching at the base of the vegetation respectively. These differences may depend to some extent on temperature since on a sunny day species which are normally ground-loving apparently tend to become more adventurous. However, even under these conditions, captures by the two techniques are often very different.

Another method of sampling the species which keep to the lower level is by sinking jam-jars or similar traps into the ground. It is best to put some dry leaves in the bottom to make it more difficult for predators caught in the trap to find their simultaneously caught prey. One is also recommended to clear the trap frequently both for the same reason and also to remove rain-water. In some samples thus caught and sent me for naming by Dr M. G. Morris, I found numbers of males of *Hardya melanopsis* Hardy, but no females, trapped between January and May and some females, but no males, taken between August and October. This suggests a marked difference of habit between the two, but the exact nature of this difference has not yet been determined.

One Polish author (Andrzejewska 1965) has suggested a mathematical way of expressing the differences between the tendencies of various species to be caught near the top or near the bottom of the vegetation respectively, or in the litter. This method involves making a framework covered with gauze above and on the four sides and dropping it over the vegetation. I feel that an alternative method would be to use a small portable suction tube, preferably with a mechanical type of vacuum-cleaner attached, which could be adjusted with the nozzle at various heights (perhaps then being slid through a holder) to collect insects at a particular level above the ground.

With all methods of collection, however, some species will be more nimble at evading being caught than others, and thus will give an impression of being scarcer than they really are. I have also been informed (C. R. Marsham, personal communication) of a case where numbers of the common frog-hopper, *Philaenus spumarius*, collected at different times on the same day, showed apparent wide fluctuation



in numbers and also (Dr N. Waloff, personal communication) where collections of leaf-hoppers made at night gave greater numbers of specimens than in the day-time. These factors should be borne in mind in any studies involving counting of specimens caught.

The majority of the British leaf-hopper specimens which I have seen (including those in the British Museum (Natural History) and the Hope Department at Oxford), have been collected in the South-East of England. There are probably a number of species which really only do occur south of a line from the Wash to the Bristol Channel, but I am sure that I tend to overestimate this number, due to the fact that most of the material in question was obtained by collectors themselves living south of this line. I am indebted, for example, to Mrs G. A. Smith who has collected near her home in Montgomeryshire and sent me specimens, several of which represented species which I had not hitherto known to occur in Wales. Other correspondents, such as Mr J. H. Flint in Yorkshire and Mr A. R. Waterston in Scotland, have also done something to redress this balance of information, but I am sure that our knowledge of the distribution of the British species is still very incomplete.

Several species have been added to the British list in recent years, some of which, like *Erythroneura rubrovittata* Leth., *Palus caudatus* Flor or *Macrosteles quadripunctulatus* Kirsch. are quite obviously distinct from other British species from their general appearance. The large and very obvious *Athysanus argentarius* Metcalf, first recorded by Marshall in 1866, was not found again until 1951, Marshall's record being for some reason ignored by subsequent writers; since then a number of collectors have found it independently in Suffolk, Kent, Sussex and Hampshire.

Up to about twenty years ago, leaf-hoppers were not considered to be harmful insects, at least for crops of temperate climates, but since then they (like other plant-sucking insects) have been recognized as vectors of a number of plant viruses, which affect, among other plants, grain, clover, strawberries and asters.

It is obviously impossible to deal in a few pages with all the problems—taxonomic, morphological and ecological—that suggest themselves in the collection and study of this group of insects, which at first sight may not have appeared to be a very exciting one. But if a few of my readers decide that this is a group worth collecting and, even more so, if one or two can help to solve some of the questions raised above, I will feel that this article has been well worth writing!

I wish to thank the Royal Entomological Society of London for permission to use drawings which have appeared in Handbooks for the Identification of British Insects or will appear in a forthcoming part. I am also grateful to Mrs Cynthia Bailey who drew figure 8.

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## CONVOLVULUS HAWKMOTH

The Sahara sand storm which covered a large part of Southern England earlier this year (1968), gave hopes that a number of interesting Lepidoptera might have been introduced at the same time. Unfortunately, 1968 appears to have been a poor season for migrant species and as the wettest summer since 1931 would not have provided suitable conditions.

My only capture of note was a fresh *Convolvulus* Hawkmoth (*Sphinx convolvuli* Linn.) found clinging to a beach hut near Bourne-mouth on October 7th. The weather was fine with a cool S.E. wind and it is of interest to note that quite a number of previous records for this species have been from this locality.

R. D. Hilliard (99).

## CAPTURE OF THE NORTHERN DRAB (*ORTHOSIA ADVENA* Schiff.) ON MITCHAM COMMON

On the night of 6th May 1968 Bernard Skinner asked if I would like to go to Mitcham Common to search for night feeding, overwintered larvae on Blackthorn (*Prunus spinosa* Linn.). We descended on a spot that is usually a good hunting ground but we found only a couple of Double Square Spot (*Amathes triangulum* Hufn.).

As an alternative Bernard suggested that we search for the larvae of Grass Emerald (*Pseuoterpna pruinata* Hufn.), which feeds on Needle-whin (*Genista anglica* Linn.). While searching successfully for this species and also finding a larva of the Broad Bordered Yellow Underwing (*Lampra fimbriata* Schreber), Bernard came across a female specimen of the Northern Drab, which was laying a batch of eggs around a stem of Needle-whin.

Carrying on the search, we found several more sitting high up on dead grass stems, all females, and all in the process of egg laying. Like the first, they were all laying their eggs around the stem. We assumed that a couple of large egg batches, which we found around grass stems but with no moth in attendance, were also of this species.

The eggs were very pale grey when laid but turned almost black prior to hatching. The larvae which I have feed readily on Sallow (*Salix* sp.).

This find on Mitcham Common ties up with the capture of a moth at my light trap on 21st April 1968, which turned out to be a male Northern Drab; the first year I have captured this species.

R. F. McCormick (3375).

## MOTHS ON A FENCE, KINGSTON VALE

It has been my sad task to record for the National Distribution Scheme the data gathered together by my friend the late Frank R. Sutton. During the course of this work I was amazed at the number of species he obtained by one particular method and in one place and I give an account of this as follows.

During the period 1953-60 my friend made frequent early morning visits to a road in Kingston Vale, S.W. London. I cannot be more accurate regarding the locality as his notes throughout refer to it as "The Fence, Kingston Vale". From what he told me this street was lighted by mercury vapour lamps and had a long stretch of wooden fence. By examining this fence before the birds and passing traffic had disturbed the resting moths he was able to record the following 68 species which I have arranged according to Heslop (1964).



- Deilephila porcellus* Linn.  
*Tethea duplaris* Linn.  
*Achlya flavicornis* Linn.  
*Dasychira pudibunda* Linn.  
*Drepana falcataria* Linn.  
*Cilix glaucata* Scop.  
*Hepialus sylvina* Linn.  
*H. hecta* Linn.  
*Agrotis clavis* Hufn.  
*A. exclamatoris* Linn.  
*Amathes xanthographa* Schiff.  
*Noctua pronuba* Linn.  
*Mamestra brassicae* Linn.  
*Hadena bicolorata* Hufn.  
*Orthosia gothica* Linn.  
*O. cruda* Schiff.  
*O. stabilis* Schiff.  
*O. incerta* Hufn.  
*O. munda* Schiff.  
*Leucania lythargyria* Esp.  
*Arenostola pygmina* Haw.  
*Apamea monoglypha* Hufn.  
*A. sordens* Hufn.  
*Phlogophora meticulosa* Linn.  
*Thalophila matura* Hufn.  
*Hydraecia oculatea* Linn.  
*Cosmia trapezina* Linn.  
*Cryphia perla* Schiff.  
*Apatele aceris* Linn.  
*A. rumicis* Linn.  
*Cucullia chamomillae* Schiff.  
*Aporophyla lutulenta* Schiff.  
*Anchoscelis litura* Linn.  
*Cirrhia icteritia* Hufn.
- Plusia gamma* Linn.  
*Alsophila aescularia* Schiff.  
*Cosymbia punctaria* Linn.  
*Sterrhia seriata* Schrank  
*S. aversata* Linn.  
*S. trigeminata* Haw.  
*S. emarginata* Linn.  
*Xanthorhoe designata* Hufn.  
*X. fluctuata* Linn.  
*Colostygia multistrigaria* Haw.  
*Ecliptopera silaceata* Schiff.  
*Oporinia dilutata* Schiff.  
*Operophtera brumata* Linn.  
*O. fagata* Scharf.  
*Eupithecia exigua* Hubn.  
*E. intricata* Zett. ssp. *arceuthata*  
*E. vulgata* Haw.  
*E. succenturiata* Linn.  
*Gymnoscelis pumilata* Hubn.  
*Erannis leucophaearia* Schiff.  
*E. marginaria* Fab.  
*E. defoliaria* Clerck  
*Selenia bilunaria* Esp.  
*Gonodontis bidentata* Clerck  
*Colotois pennaria* Linn.  
*Phigalia pedaria* Fab.  
*Apocheima hispidaria* Schiff.  
*Lycia hirtaria* Clerck  
*Biston strataria* Hufn.  
*Cleora rhomboidaria* Schiff.  
*Pseudoboarmia punctinalis* Scop.  
*Ectropis crepuscularia* Schiff.  
*Aethalura punctulata* Schiff.  
*Itame wauaria* Linn.

John E. Knight, FRES (94).

## SPRING BUTTERFLIES IN SOUTHERN SPAIN

I always enjoy reading about other members' discoveries during their holidays on the Continent so I have little hesitation in offering a short account of my visit to Marbella, on the Costa del Sol, from 27th April to 10th May 1968.

Marbella lies on the South Coast of Spain between Malaga and Gibraltar; behind the town there is a two mile belt of undulating farm land before the mountains rise steeply to 4,000 feet. The uncultivated meadows and Olive orchards were a botanist's paradise (or nightmare!) especially beside the little streams which flowed down from the mountains. On the lush banks of one of the streams we found three species of orchid in considerable quantity, including some Bee orchids (*Ophrys apifera* Huds.) over two feet in height. The song of a few Nightingales and Golden Orioles among the other birds added further pleasure to the surroundings.

Our package-deal holiday was intended to be a complete rest but I became so interested in the numerous butterflies around that I was 'at it' nearly every day and eventually even my wife was wielding the net and assisting with my camera equipment.

Photographing the butterflies was extremely difficult as they seemed exceptionally active in the fierce sunshine. I murdered and brought home a small selection of them and also made a careful record of those I saw.

### Table

List of Butterflies seen at Marbella, Spring 1968  
(nomenclature as in Cribb, 1967)

#### Satyridae

##### SATYRIDAE

- Pararge aegeria* (Speckled Wood) Continental orange-spotted form.  
*Agapetes ines*  
*Pyronia bathseba*  
*Pyronia cecilia*  
*Maniola jurtina* (Meadow Brown) Form *hispulla*.  
*Coenonympha pamphilus*  
 (Small Heath)

#### Nymphalidae

##### NYMPHALIDAE

- Melitaea phoebe*  
*Vanessa cardui* (Painted Lady)

#### Lycaenidae

##### LYCAENIDAE

- Lampides boeticus* (Long-tailed Blue)  
*Syntarucus telicanus*  
*Cupido minimus* (Small Blue)  
*Aricia montensis*  
*Polyommatus icarus* (Common Blue)  
*Lysandra bellargus* (Adonis Blue)  
*Lycaena phloea* (Small Copper) Form *punctata*.

#### Pieridae

##### PIERIDAE

- Pieris brassicae* (Large White)  
*Pieris rapae* (Small White)  
*Anthocaris euphenoides*  
*Euchloe ausonia*  
*Euchloe belemia*  
*Colias croceus* (Clouded Yellow) Several Var. *helice* also seen.  
*Gonepteryx cleopatra*

#### Hesperiidae

##### HESPERIIDAE

- Carcharodus alceae*

All of the butterflies listed were found within two miles of Marbella. The 'Blues' and the Orange Tip (*E. euphenoides*) were beyond their best but one day we went by bus up to the village of Ojen, six miles inland in a mountain pass, and there, at 1,000 feet, the 'Blues' were numerous and relatively fresh.

Although there was plenty of Fennel (*Foeniculum* sp.) growing near the streams we saw no sign of the Swallowtail (*Papilio machaon* Linn.).

During two excursions inland, one to Granada and the other to Ronda, we saw Red Admiral (*Vanessa atalanta* Linn.) and Scarce Swallowtail (*Papilio podalirius* Linn.) in the gardens but the latter were very faded and worn.

Finally an apology for an error I made in my short article on butterflies seen in Majorca (*Bull. amat. Ent. Soc.* **25**: 133). The species which I assumed to be a local form of Gatekeeper (*Maniola tithonus* Linn.) was quite definitely *Pyronia cecilia*. Mr M. J. Percival (3798) suggested this as more probable in his article on Majorca. (*Bull. amat. Ent. Soc.* **26**: 95).

P. R. Grey (3820).

**TROX HITIGIOSUS**

Superfamily Scarabaeoidea

Family Trogidae



TROX HITIGIOSUS

The above drawing was made from a specimen captured at light by Mr K. Dansie of Broken Hill, New South Wales.

This species is a bit larger than any of the four British representatives, being about 15mm long. It is similar in appearance to the British members.

I think it is safe to assume that its habits and life history are very similar to the British species and like them probably feeds on decaying animal debris, dry carcasses, or in the nests of birds of prey.

My thanks go to Mr Dansie for supplying the beetle, and to my father for helping me with the drawing.

23.1.1969

Jonathan Cooter (3290).



## BOOK REVIEW

**Insects**, by John Clegg. pp 144, 52 Illustrations. Frederick Muller, London, price 18/-.

This work by John Clegg is meant as an introduction for the beginner into the principles of entomology. It is a really excellent essay in presenting the physiology and habits of insects to the younger reader in such a way that he is not overwhelmed by too much fact and too many new scientific terms. The work is well illustrated with both line drawings and black and white photographs, some of which are highly magnified views of the organs of insects. After dealing with the structure and habits of various insects there is a chapter of 13 pages on Studying Insect or practical entomology. My only criticism of the work is that I would have preferred the author to have omitted chapters 10 and 15 on Insects and Diseases and Waging War on Insects, hardly relevant in a book introducing the beginner to the study of entomology, and enlarged the last chapter on the Study of Insects. I congratulate the publishers on the layout and type face, it makes this a clean and readable book. The work ends with a short but adequate bibliography and an unsolicited advertisement for this Society which is very welcome. The address given is now out of date but this may be due to the Society not giving sufficient publicity to the change of address.

G. P.



## COUNCIL'S REPORT 1968

**Business of the Society.** During the year the Council met on six occasions, once under the Chairmanship of the President, Mr B. R. Stallwood, once under that of Mr R. Hilliard and under that of Mr P. W. Cribb on four occasions. During the year the Society lost the able services of its Bulletin Editor, Mr H. V. Danks, who took up a position in Canada. Due to the good notice that he was able to give to the Council, it was possible to find a replacement in time to ensure a smooth handover of office and we were fortunate in obtaining a new Editor, Mr David Corke who has now produced two issues of the *Bulletin*, maintaining the very high standard set by Mr Danks. Mr D. E. Dodwell retired from the Office of Enrolment Secretary and his duties are now in the hands of Mr David Keen. The Council wishes to record its thanks to Mr Dodwell for his past services in this and other offices.

**Bulletin.** This has been issued with the Wants & Exchanges List regularly each quarter. Material has been generally forthcoming but the Editor would welcome more short items to balance the longer articles received.

**Publications.** It has not been possible to publish the long-awaited items during 1968 but final preparations were made for the leaflet on Stick Insects and the reprinting of the Hymenopterist's Handbook, also a leaflet on Fleas. The Hon. Secretary prepared and published a new Membership List giving members up to December 1967. The sales of our publications rose during the year and in particular the sale of back numbers of our *Bulletin*.

**Meetings.** At the A.G.M. in March a member, Mr W. Beer, presented two excellent films on Butterfly Lives, made by himself and Mrs Beer. The Exhibition was again held in the Hugh Myddleton School on the first Saturday in October. The attendance was greater than that of last year and the income from table rents, etc. enabled the function to show a financial profit for the first time for many years. However the Council was sorry to see the number of exhibits fall sharply, possibly due to a poor season, and distressed to see how many members who had not mounted an exhibit were using the occasion to sell surplus livestock. The Council wishes to emphasise the need for every member to try to mount some exhibit so that 'buying and selling' does not become the major item of our afternoon together. Mr Skinner and his helpers are congratulated on the arrangements. Four Field Meetings were arranged during the year by Mr R. Allen, Field Meetings Secretary, and members are again urged to support him by attending these functions and also offer their services to lead such meetings. The Council would welcome more local group meetings in those places remote from London and members are urged to cooperate with local Societies.

**Youth Secretary.** Mr H. Berman continued to act as our Youth Secretary, supplying items and a quiz for the *Bulletin* and helping junior members with their queries.

**Groups.** Two Groups are active at present—the Silk Moth Rearers and the Conservation Groups. More specialist sections would be welcome. Mr W. Parker has taken on the task of coordinating the Conservation Group and all who have an interest in this work should contact him so that the coverage of the Country by the Group should be as large as possible.

**Membership.** During the year 141 new members joined the Society and after deaths, resignations and non-payers are accounted for, the total membership increased by two. The Council realises that in catering for the beginner some losses are inevitable but would thank those older members who remain so faithful and encourage youth in taking up our interesting field of recreation and study. We record with regret the death during the year of two members—G. J. Eade (190) and E. H. Richards (3020).

**Conclusion.** The Council feels that the Society is in good shape. Membership though fluid, maintains its numerical strength and there is an air of enthusiasm and helpfulness within the Society which has encouraged the Council in its many tasks during the year and augurs well for the future.

## REPORT ON MEETING OF THE AMATEUR CONSERVATION GROUP

An excellent meeting was held at Caxton Hall, Westminster on 11th January, 1969, to formulate a policy and discuss ways of implementing this. The meeting opened at 2.20 p.m. and a lively discussion took place, as a result of which the policy was finalised.

- i) The conservation of habitat is to be the prime function of the group.
- ii) The conservation of species would be the second function of the group.
- iii) The introduction of the species would not be carried out by the ACG on its own but with the assistance of other naturalist organisations in areas where release was intended.

It was suggested at the meeting that all members of the AES could help in the conservation of habitat. If any of you hear or read in your local newspaper of a proposed development, industrial estates or gravel extraction, road making, turning of heaths and commons into agricultural land and the felling of woods, and you feel any of these will upset the general amenity value of the area, check the facts and contact the secretary of the ACG but do not wait until bulldozers have moved in for then it will be too late.

For the protection of the habitat the group will liaise with all interested persons and organisations to try to protect large areas from being swallowed up by urbanisation. It must be remembered that anyone can protest against proposals that are regarded as a danger to conservation regardless of district. When Authorities and Members of Parliament receive many letters from various organisations and individuals, this carries more weight than one letter from a large organisation as the Authorities are far better able to evaluate the amount of amenity value the area has.

Much discussion took place on conservation of the species and many suggestions were put forward. The group has now received the services of an adviser—Mr Brian Baker, Assistant Curator of Reading Museum, who is known for his conservation work and reserve management. I will discuss the whole set of proposals with him and will publish at a later stage the most practical way to put these into operation.

Re-introduction of the species—here there was much disagreement between members and in the light of the great national debate now going on, the compromised solution was the most sensible in the circumstances. Please do not lay down any species until you have told your Natural History Society of your intent and notified the ACG secretary. It is hoped that all members would join their respective Natural History Society. It is a fact that in such Societies entomology usually finishes a poor third after birds and flora. It is hoped here that members would publicise entomology to raise it to the same status as the other main groups. If we can only get the ornithologist to recognise his food supply



and the botanist his pollinators, we will have taken a great step forward

On the subject of publicity it is hoped to give a number of exhibitions this year. All these will have the same theme 'Conservation and the Insect'. The group intends to hold a field meeting this year, most probably along the Kennet and Avon Canal, to start at Newbury. As the canals are now being opened to pleasure traffic it would be a good idea to look round the canal and surrounding countryside and note all life that abounds therein. From this visit we may be able to suggest a plan as to what would be worth conserving before the speculators move in.

Last year the group united with the TIEG Coleoptera group run by David Lonsdale who is very interested in the *Hydrophilus* species. It was suggested at the meeting that we should liaise closely with the TIEG. The conservation side of that organisation is run by Nicholas Cook who is also a member of the ACG and we shall have no difficulty in carrying out that suggestion.

The greatest success we had last year was in conjunction with other interested bodies to get the Corporation of London to re-affirm its attitude to the Bucks County Council's proposal that a link road connecting the M4 to the M60 should pass through Burnham Beeches (the beech woodlands north of Slough). Their re-affirmation is so strong that it is doubtful whether the BCC will proceed with their original ideas. If they do then this group has its name down to attend the enquiry.

We hope that the meeting will now turn into an annual event and all members present wish to thank Paul Evans who travelled all the way from Shropshire to attend—a truly great effort.

Enquiries about the group should be made to the Secretary, ACG, 33a Willows Park, Maidenhead Road, Windsor, Berks.

W. Parker (4059).

### ANNUAL REPORT OF THE SOCIETY'S REPRESENTATIVE ON THE JOINT COMMITTEE FOR THE CONSERVATION OF BRITISH INSECTS

This newly formed committee was set up last year to replace the Conservation Committee of the Royal Entomological Society, which was wound-up due to administrative difficulties, and the Entomological Liaison Committee of the Nature Conservancy, which was also wound-up when the Conservancy re-organised its committees. The new committee has much the same aim as the previous ones which is to obtain as broad a spectrum as possible of entomological opinion on conservation matters in order that well-informed and enlightened suggestions can be made and advice given to the appropriate authorities, i.e. the County

Naturalist's Trusts, the Nature Conservancy and the Forestry Commission etc.

It may interest you to know the membership of the Committee which is: Mr N. D. Riley (SPNR) Chairman, Dr M. G. Morris (RES) Secretary, Mr D. Bevan (Forestry Commission observer), Mr J. F. Burton (RES), Mr A. Brindle (N. of England), Mr R. Goodden (Brit. Butterfly Conservation Soc.), Mr T. G. Howarth (AES), Dr R. James (E. Anglia), The Keeper of the Dept. of Entomology, BM, (NH), Mr A. Kennard (W. Region), Dr H. B. D. Kettlewell (RES), Mr E. C. Pelham-Clinton (Scotland), Dr J. Smart (RES), Mr A. E. Stubbs (Brit. Ent. & Nat. Hist. Soc.), Prof G. C. Varley (Brit. Trust for Entomology).

The majority of the members though representing other bodies or regions are also Fellows of the Royal Entomological Society of London.

The Committee held its first meeting last November when the actual representation on it was discussed at some length particularly in regard to regional representation. It also considered a letter from the Regional Officer for East Anglia concerning a Public Enquiry into the tipping of refuse on Hadleigh Marsh.

I am sure that by the setting up of this committee something useful can be done to prevent or circumvent man's often senseless onslaught on our fast diminishing fauna and I look forward to much active co-operation and help with and by the individuals of our own Conservation Group aided by its very able Secretary, Mr Parker.

T. G. Howarth.

## JUNIOR NEWS SECTION

Before I give you the answers to the May quiz competition and news of members I would like to announce yet another competition to keep you busy. This is specially for the photographers and is being arranged by a junior member from Cheshire, R. Leaver. If you are interested please will you write directly to R. Leaver (4355j), Beech House, Lymm, Cheshire who will send you full details. Try not to forget he stamped addressed envelope, please.

It is hoped that the pictures entered can be displayed at the Annual Exhibition in the Autumn.

The AES Annual Exhibition is going to be the very best ever this year as you are going to do your utmost to get there with an exhibit (no matter how small).

Now some news from members: A short break in the weather emptied T. Wilkinson (4333j) out to enjoy the winter sunshine where he was pleased to meet a perfect male Small Tortoiseshell (*Aglais urticae* Linn.) doing the same. This was popped into a pairing cage and a search

was made for other early butterflies. He was spurred on by news of a Red Admiral in his area.

During this very same late winter sunshine I saw various butterflies here in St. Ives, Huntingdonshire, but real spring with its bumblebees did not reach East Anglia until the end of April.

Although it was the early sightings of butterflies which prompted T. Wilkinson to write in to the *Bulletin* he says that during his second year of serious entomology he will turn from purely making a reference collection to studying life histories. He hopes to breed many species including insects other than Lepidoptera. I also know that he is very concerned about what he calls 'our decreasing insect population'.

Andrew Kent (4242j) is a Saturniid Silkmoth enthusiast and has a number of eggs from different Japanese species. His stock includes 30 *Dictyoploca japonica*, 12 Oak Silkmoths (*Antheraea yamamai*), 53 *Rhodinia fugax* and 13 *Caligula boisduvali jonasi*. He was also expecting 24 Owl moths *Brahmaea wallichii japonica* and hopes to breed large numbers of all of these especially *R. fugax*.

Andrew complains that he had very bad luck with some Kentish Glory Moth larvae which hatched just that little bit too early. They emerged in mid March when there was still snow about and he was layed low with a liver infection and feverish cold. He survived but they didn't. Better luck next year with over wintering pupae.

Andrew is also a phasmidologist or Stick Insect fancier and keeps the Indian Stick (*Carausius morosus*), the Madagascan Flying Stick (*Sipyloidea sipylos*) and the Corsican (*Clonopsis gallica*). I do hope the South African Stick Insect eggs he had received when I last heard from him are now showing signs of life.

Have you had trouble with your pets eating each other? Andrew has. First of all it was his cats which knocked over his Stick Insect cage and ate some of them then the Indian Sticks set about the Corsican Sticks and promptly made a meal of some of them. He felt that he ought to do something about improving the diet of his charges. His answer was a powerful concoction based on Smith's Elixir found in Crotch's Silk Moth Rearers Handbook. He has not told me how the cats liked it but he reports that the caterpillars and Stick insects enjoyed it immensely. Please write to him if you want the recipe.

Andrew also noted that some of his Indian Stick insect eggs were very tiny and wondered whether this might be due to faulty feeding. He also noted that some of his infertile moth eggs apparently contained dead embryos. Experts say this is not unknown among the larger moths but it is still very interesting.

Further news now of 13 year old Miss Elizabeth Fisher (4183j). Elizabeth appears to be making full use of her AES membership and has corresponded with senior members who I know are only too pleased to help with surplus specimens and advice. She says she is anxiously awaiting the emergence of pupae sent her by Mr Gent (192) and Mr Morrell (4061). These are Cabbage Moths (*Mamestra brassicae*), an



Emperor Moth (*Saturnia pavonia*) and an Elephant Hawk *Deilephila elpenor*). In addition to these she also has the chrysalis of a White Ermine Moth (*Spilosoma lubricipeda*) which pupated after feeding on Groundsel. This one should be out by June.

Elizabeth is also a Saturnid enthusiast and is rearing larvae of *Caligula boisduvali jonasi* (the East Asian Silk Moth) on Hawthorn and is hoping to get good results from her Japanese *Dictyoploca japonica*.

Her Madagascan Flying Stick Insects are thriving on Bramble and are assuming large dimensions. (If only they did not smell so peculiar.)

Elizabeth is also interested in beetles and was rather pleased with the large Weevil *Barynotus obscurus* she caught in long grass just before Christmas. A beetle which caught her eye while she was mending her bird table on a sunny day in April was a black little fellow with four yellow blotches on his elytra (wing cases). At first she identified it as the Little Four Spot Ground Beetle (*Bembidion quadrimaculatum*) but further enquiries through the AES Beetle referee proved it to be a Four Blotched Fungus Beetle (*Mycetophagus 4-pustulatus* Linn.).

I hope that Elizabeth is enjoying a busy and rewarding season as by the way she wished you all.

John Dapling tells me he is doing some work with Locusts. Please don't forget to let us share your observations, John.

And now at last here are the answers to the May quiz:

- (1) 'Leather jackets' are larvae of Crane flies. Some of them interest the gardener because they eat away grass roots damaging the lawn.
- (2) I trust you all knew the scientific name of the Brimstone Butterfly: *Gonepteryx rhamni*.
- (3) Sheep Keds are truly strange insects. They are real Flies: Diptera but have no wings. They are parasites feeding on the blood of sheep.
- (4) You had to draw and colour a Death's Head Hawk Moth caterpillar.
- (5) 'Wood worm' is the common name given to the larvae of various beetles and as their name implies they spend the early part of their lives eating holes in timber.
- (6) Ocelli are the insect's simple eyes. They are believed to record light intensity, and are almost certainly unable to see pictures. Some authorities think ocelli help flying insects to find their way, while others feel that their job is to keep the insect alert.
- (7) Dragonfly nymphs catch the water animals they live on with a very efficient pincer mask located just beneath their heads.
- (8) A coloured drawing of Beautiful Utetheisa Moth *Utetheisa bella* was wanted here.
- (9) I don't think I caught anybody out with this one. Of course Frog-hopper nymphs protect themselves by making a frothy tent in which to hide. They are also known as Cuckoo Spit Insects.
- (10) I wanted a coloured drawing of an infamous Colorado beetle larva for this one—not an adult.
- (11) It is doubtful whether Codling Moths themselves do any harm but

their caterpillars can be an unpleasant nuisance especially when you bite them in half while enjoying an apple. (Ugh!)

- (12) An adult Mayfly usually only survives for 24 hours whereas the young nymphs can live for three years under the water.
- (13) You were required to draw simple diagrams of baby ants, fleas and social wasps. I expect you were surprised to find how unlike their parents the larvae are.
- (14) The Horntails are also known as Wood Wasps. Their larvae eat deep into trees. By the way the spike sticking out of female Horntail is a sawing ovipositor for laying eggs beneath the bark of tree. It is not a sting.
- (15) Tiger Beetle (*Cicindella*) larvae live in deep burrows. They have strong sickle-shaped jaws with which they seize any insect unfortunate enough to come too close.
- (16) Another coloured drawing of a Beetle larva was wanted for this one—a Seven-spot Ladybird.
- (17) How many species of British butterflies there are is possibly a matter of opinion. If you put down 57 to 68 I would have accepted it.
- (18) Blue Bottle Fly larvae or gentles feed on dead animals (rotting meat). Do not confuse them with House Fly larvae which feed on manure.
- (19) Lacewing larvae are those voracious little fellows who march about on plants disguised as piles of rubbish. It would not fool us but it gets them within snapping distance of their favourite Aphids.
- (20) I am still open to polite offers for suggestions as what you would like to read about in your Youth Section.

A list of winners is to follow in the next issue.

H. J. Berman, FRES (2971A).

### ●

### CORRECTIONS: THE STUDY OF MAYFLIES (EPHEMEROPTERA)

The editor regrets the following printing errors in Dr Macan's article (*Bull. amat. Ent. Soc.* **28** (283): 52-67). The captions to the illustrations on page 61 were reversed. The upper illustration shows the nymph of *Baetis rhodani*, the lower illustration being a dorsal view of a *Centroptilum pennulatum* nymph.

A word was transposed in the section on Anglers' names. Lines seven to nine of this section should read as follows: "Some of their names apply only to one sex at one stage; for example the Iron Blue Dun is the subimago of both *Baetis pumilus* Burmeister, and *B. niger* Linn., and the imagines . . ."

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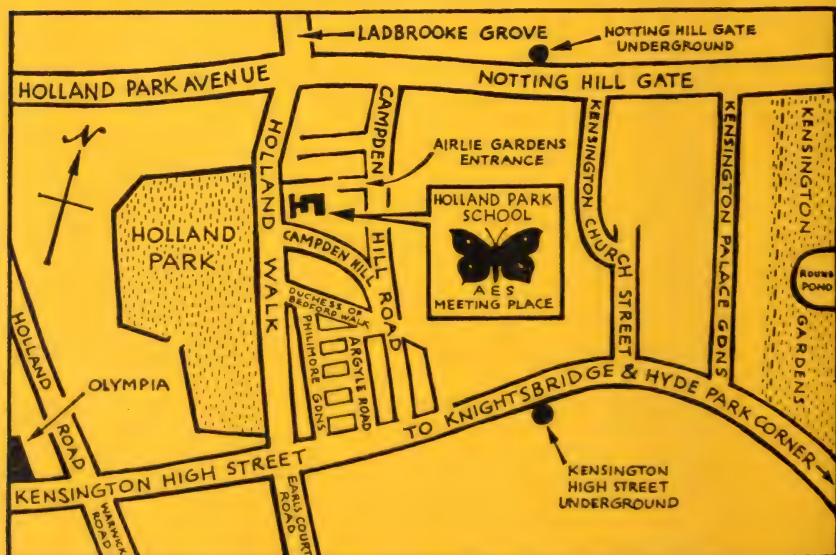
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DECEMBER, 1969



# THE BULLETIN OF THE AMATEUR ENTOMOLOGISTS' SOCIETY

World List abbreviation : Bull. amat. Ent. Soc.

EDITED by DAVID CORKE, B.Sc.,  
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## **The Amateur Entomologists' Society**

Published August, 1966

PAMPHLET No. 11

# **A Label List of the Butterflies of North, Western & Southern Europe**

**Compiled by P. W. CRIBB**

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**COLLECTING NOTES—WINTER 1969**

**The Smaller Moths**

Every moth is present in one of its stages during the winter and some are not difficult to find. One of these is *Mniophaga affinis* Haw., whose larva feeds on moss during the early months of the year. According to Tutt it may be found on the surface of its foodplant early in the morning before the dew has evaporated. Of this species Mr Bradford writes as follows: "I have taken a number of this moth in the garden which has quite a lot of moss growing in walls and on the ground. The larva feeds on the moss growing on the walls. I often find the moth flying up against the roof and in the guttering.

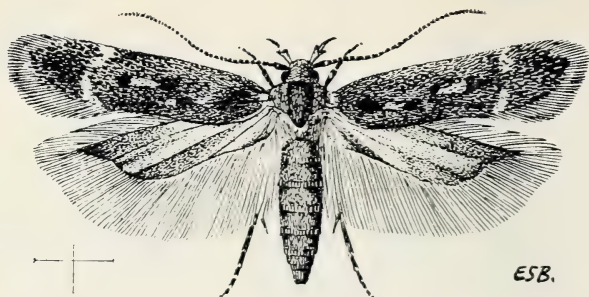
"The overall colouring is brownish, the hindwings being more greyish brown. The forewings are speckled with creamy white scales and ochreous patches and the stigmata are black. The adult is on the wing in June and July."

The larvae of various species of the Tortricidae feed on roots during the winter. One of these is *Agapeta hamana* Linn., which is the subject of Mr Bradford's second illustration. He writes: "In the last few years I have found this moth a number of times, especially in two areas of thistles (*Carduus* spp.) around Borehamwood, Hertfordshire. The larva feeds in the roots of this plant, but I have never purposefully looked for it myself, as yet. Previously I had only taken the odd specimen here and there, but on 26th July, 1965 I had the pleasure of seeing seven or eight specimens flying about in an overgrown corner of a field. One pair were gyrating about each other and I presumed they were male and female; it was very interesting. I witnessed a similar situation on 10th July, 1967 in the Brickfields in Borehamwood, when I again saw numbers flying about and a couple bent on procreating the race.

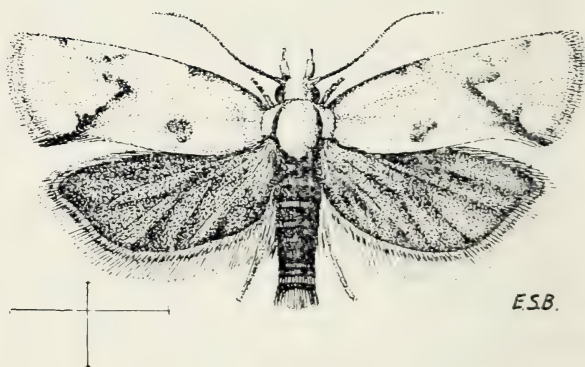
"The forewings of *A. hamana* are a primrose-like yellow, paler in some specimens. The base of the costa is a fuscous-brown colour, getting more orange-brown along the edge towards the apex. In some specimens the darker costal edge fades out about the middle. From the discal cell there is a fuscous-brown streak towards the tornus. In some specimens there are further orange-brown marks along the margins of the wings. The hindwings are a darkish brown-grey."

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*Front cover illustration:* The swallowtail butterflies *Papilio machaon* Linn., and *P. podalirius* Linn., drawn by Mr. A. M. Freebrey.



*Mniophaya affinis* Haw.



*Agapeta hamana* Linn.

The larvae of two relatives, *Agapeta zoegana* Linn., and *Commo-phila aeneana* Hübn.—a most beautiful moth—are to be found on the roots of Knapweed (*Centaurea* spp.) and Ragwort (*Senecio* spp.) respectively. Another group of root-feeders which are an excellent quarry for the winter collector belongs to the genus *Dichrorampha* (the *Hemimene* of Meyrick and Ford). Some of the species are very similar, and bred specimens will be easier to identify with certainty. The roots of Yarrow (*Achillea millefolium* Linn.) will produce *Dichrorampha petiverella* Linn., *D. gueneana* Obraztsov (*politana* Guen.), *D. sequana*



Hübner, *D. plumbagana* Treits., *D. montanana* Dup. (*tanacetii* Staint.) and *D. plumbana* Scop. The closely related Sneezewort (*A. ptarmica* Linn.) provides *D. pseudoalpestrana* Danil (*alpestrana* Staint. nec H.-S.), both the foodplant and its moth being very much more local: they are best sought on marshy ground. Tansy (*Chrysanthemum* (*Tanacetum*) *vulgare* Linn.) harbours *D. flavidorsana* Knaggs (*alpina* Meyr. nec Treits.), *D. gueneana*, *D. sequana*, *D. montanana*, *D. acuminatana* Zell. and *D. saturnana* Guen., while the Ox-eye Daisy (*C. leucanthemum* Linn.) provides *D. alpina* Treits., *D. plumbana* and *D. aeratana* Pierce. Finally Mugwort (*Artemisia vulgaris* Linn.) is the foodplant of *D. simpliciana* Haw. The foodplants are all closely related Compositae and the similarity of many of the moths is reflected in the confusing synonymy. The majority of these species are abundant where they occur and are not difficult to breed. They may be found on the garden, as well as the wild, varieties of their foodplant.

When the roots are dug up, the larvae may not be much in evidence, but this does not mean that they are not present; for instance, a few years ago a friend bred six specimens of *D. pseudoalpestrana* from a rootstock of Sneezewort which he had supposed to hold only two larvae. The roots may be dug up at any time during the winter, though the later this is done the better the prospects of success. The roots should be replanted in a convenient corner of the garden and there is no need to enclose them in any way until the moths are due to emerge from May onwards. The larvae pupate in earthen cocoons close to the roots on which they have fed.

A. M. Emmet (1379)

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### SCOTTISH ENTOMOLOGY 1967-68

#### A New Species to the British List

The first practical results of these reports of which this is the third are now beginning to show. As I mentioned in my last report (for 1966), I had doubts about the status of *Pieris napi* (Green-veined White Butterfly) in upland areas of Scotland, the result of which is that we now have another species on the British List.

After some correspondence with various AES members, Dr Stopher of Deal kindly passed on some specimens to B. C. S. Warren for examination. Thus began a number of interchanges of questions and

Table 1.

Check List of the Scottish Butterflies.

## HESPERIIDAE

<i>Erynnis</i>	<i>tages</i> Linn.	<i>tages</i> Linn.
<i>Carterocephalus</i>	<i>palaemon</i> Pall.	?

## PIERIDAE

<i>Pieris</i>	<i>brassicae</i> Linn.	<i>brassicae</i> Linn.
	<i>rapae</i> Linn.	<i>rapae</i> Linn.
	<i>napi</i> Linn.	<i>napi</i> Linn.)
	<i>adalwinda</i> Frhst.	<i>thomsoni</i> Warren
<i>Anthocharis</i>	<i>cardamines</i> Linn.	<i>cardamines</i> Linn.
<i>Colias</i>	<i>croceus</i> Linn.	<i>croceus</i> Linn.

## LYCAENIDAE

<i>Cupido</i>	<i>minimus</i> Fuessl.	<i>minimus</i> Fuessl.
<i>Aricia</i>	<i>artaxerxes</i> Fabr.	<i>artaxerxes</i> Fabr.
<i>Polyommatus</i>	<i>icarus</i> Rott.	? <i>icarus</i> Rott.
<i>Lycaena</i>	<i>phlaeas</i> Linn.	<i>phlaeas</i> Linn.
<i>Callophrys</i>	<i>rubi</i> Linn.	<i>rubi</i> Linn.
<i>Thecla</i>	<i>quercus</i> Linn.	<i>quercus</i> Linn.

## NYMPHALIDAE

<i>Clossiana</i>	<i>selene</i> Schiff.	<i>selene</i> Schiff.
		<i>insularum</i> Har.
<i>Mesoacidalia</i>	<i>euphrosyne</i> Linn.	<i>euphrosyne</i> Linn.
	<i>charlotta</i> Haw.	<i>charlotta</i> Haw.
		<i>scotica</i> Watkins
<i>Euphydryas</i>	<i>aurinea</i> Rott.	<i>aurinea</i> Rott.
		<i>praeclara</i> Kayne
<i>Vanessa</i>	<i>atalanta</i> Linn.	<i>atalanta</i> Linn.
	<i>cardui</i> Linn.	<i>cardui</i> Linn.
<i>Aglais</i>	<i>urticae</i> Linn.	<i>urticae</i> Linn.
<i>Inachis</i>	<i>io</i> Linn.	<i>io</i> Linn.

## SATYRIDAE

<i>Pararge</i>	<i>aegeria</i> Linn.	<i>tirsis</i> Butler
<i>Lasiommata</i>	<i>megera</i> Linn.	<i>megera</i> Linn.
<i>Erebia</i>	<i>epiphron</i> Knoch.	<i>aethierius</i> Vrtý.
	<i>aethiops</i> Esp.	<i>aethiops</i> Esp.
<i>Hipparchia</i>	<i>semele</i> Hubn.	<i>semele</i> Hübn.
<i>Maniola</i>	<i>jurtina</i> Linn.	<i>splendida</i> B.White
		<i>insularis</i> Thomson
<i>Coenonympha</i>	<i>pamphilus</i> Linn.	<i>pamphilus</i> Linn.
	<i>tullia</i> Mull.	<i>tullia</i> Mull.
		<i>scotica</i> Stgr.
<i>Aphantopus</i>	<i>hyperanthus</i> Linn.	<i>hyperanthus</i> Linn.

answers during which time I collected a series of specimens for Mr Warren to work on. His results were published in the Entomologist's Record in December 1968 and prove to be very remarkable. As it happens the butterflies of Perthshire, Stirlingshire and Fife are not *P. napi* but *P. adalwinda* the same species which inhabits Scandinavia! The study of these insects is quite a complicated one but it is clearly explained in Warren's paper.

The androconial scales of *Pieris* vary considerably from species to species and to some extent from sub-species to sub-species. *P. adalwinda* has derived from the Asiatic cross *P. narina* × *P. dulcinea* and *P. napi*

from *P. adalwinda*. However, the Scottish race (*thomsoni* Warren) is a form of *P. adalwinda* which is so unstable that four types of androconial scales occur, each of which are typical of a distinct species: *P. narina* Vrtý., *P. adalwinda*, *P. marginalis* Scudder and *P. napi*. *Pieris bryoniae* Ochs. does not occur and *thomsoni* is certainly a sub-species of *P. adalwinda*.

It is not an easy matter to separate *P. a. thomsoni* from *P. napi* and specimens which look identical to *P. napi* occur with the Scottish species. *P. a. thomsoni* females are very well marked usually with a fair amount of dark suffusion on the upperside. Females with a yellow ground colour form about 25% of the populations in the spring often being very well marked as in *P. bryoniae flavescens* Wagner. Large well marked white females are most common in the second brood. In both sexes the yellow of the underside hind wings is deeper and the black nervures are blackish rather than greyish. But all these are very variable.

I am now working on the distribution of these species and would welcome specimens of *P. napi/adalwinda* from anywhere in the British Isles.

In the last few years a number of changes have taken place in the British list, many of which have to do with Scotland and I feel that it is worth while at this stage to print a list of Scottish butterflies. Obviously the distribution of many of the species is still not fully known, particularly in the remoter parts of the north and west but the Monks Wood Mapping Scheme should go a good way towards filling this gap.

Lack of information on the part of contributors and time on my part has meant that I was unable to prepare a report for 1967. As it happened '67 was a rather poor year for the most part, weather in the months of July and August being very unfavourable, at least for diurnal insects. It was, however, quite a different story in 1968 when Scotland basked in sunshine while south of the border new maximum records for rainfall were being created. Because of the great contrast between the seasons I thought it would be interesting to treat this report as a comparison between the two years.

## Butterflies

Emergence and flight periods for the two years are given in Table 2. One of the most remarkable differences between the two seasons was in the numbers of *Pieris brassicae* (Large White) and *P. rapae* (Small White). In 1967 I saw no *P. brassicae* in Scotland while in 1968 the first specimen was noted in mid-June and were seen almost daily until the end of September. Although *P. rapae* emerged a month later than in the previous year it was still flying at the end of September very much more commonly than in the past few years.

There was another influx of *Vanessa cardui* (Painted Lady) in the



Table 2.  
Emergence and Flight Periods 1967-1968.

	1967		1968	
	First Rcd	Flight Pd	First Rcd	Flight Pd
<b>PIERIDAE</b>				
<i>Pieris brassicae</i> (Large White)	—	—	9.6	102 days
<i>P. rapae</i> Gen. I (Small White)	23.4	—	25.5	21 days
Gen. II	10.8	40 days	15.6	65 days
<i>P. adalwinda</i> Gen. I	1.6	15 days	16.5	81 days
Gen. II	5.8	—	30.7	31 days
<b>NYMPHALIDAE</b>				
<i>Vanessa cardui</i> (Painted Lady)	—	—	September	
<i>Aglaïs urticae</i> (Small Tortoiseshell)	13.4	117 days	12.4	161 days
<i>Clossiana euphrosyne</i> (Pearl Bordered Fritillary)	—	—	14.6	—
<b>SATYRIDAE</b>				
<i>Erebia epiphron</i> (Mountain Ringlet)	23.7	—	—	—
<i>Hipparchia semele</i> (Grayling)	10.8	—	—	—
<i>Aphantopus hyperanthus</i> (Ringlet)	23.7	12 days	26.7	—
<i>Maniola jurtina</i> (Meadow Brown)	7.7	33 days	18.7	(20 days)
<i>Coenonympha pamphilus</i> (Small Heath)	10.6	57 days	14.6	66 days
<i>C. tullia</i> (Large Heath)	—	—	15.6	—
<i>Calliophrys rubi</i> (Green Hairstreak)	10.6	—	23.5	—
<i>Lycaena phlaeas</i> (Small Copper)	10.8	—	14.6	105 days
<i>Polyommatus icarus</i> (Common Blue)	7.7	33 days	18.7	30 days

autumn of 1968. The last sizable migration to come inland was in 1966, but strangely few *Aglaïs urticae* (Small Tortoiseshell) were about. 1967 was a good year for *A. urticae*. *Clossiana selene* (Small Pearl Bordered Fritillary) was missing from its usual habitat here in South Perthshire though I believe elsewhere it was quite common. *Aphantopus hyperanthus* (Ringlet) was out in good numbers in both years but I was on holiday during the best part of *Maniola jurtina* (Meadow Brown) in 1968. *Coenonympha pamphilus* (Small Heath) was normal in both years from the emergence and flight period point of view and seems to be able to stand up to the worst of weather without suffering any loss in numbers.

One of the brightest aspects of 1968 was the return of *Lycaena phlaeas* (Small Copper). After only a single specimen in 1967 the butterflies were really quite common here in Dunblane.

How much the weather can affect the populations of our butterflies in the long run I do not know, but it will be interesting to see the effect of the long drought on Cumbræ in the Firth of Clyde on the island's insect populations. I have been able to trace one such drought affecting the butterflies of a British island. This was the Isles of Scilly where the average spotting on the underside hindwing of *Maniola jurtina* changed in the following year. On this subject I will probably be able to write next year when I will have collected there.

## Moths

The use of a Rothamsted-type trap (i.e. Tungsten and chemical jar) presents one with a most useful set of records for comparative purposes. As the light attracts far fewer moths than an M.V. or similar source trap and does not have the accumulative affect the same individuals are not taken (and thus counted) on more than one occasion. My trap was run every night during 1967 and 1968 and the following notes relate only to my catches here in Dunblane.

It is very difficult to interpret the records for the two years but to generalise the Noctuids were earlier on the wing in 1968 with numbers up on 1967 while the Geometrids were late in 1968 with numbers about the same as in 1967. *Diarsia rubi* was over a week earlier in 1968 as was *Ochropleura plecta* and *Amathes baja*. The numbers of *Cerapteryx*

Table 3.

The emergence times of some moths in central Scotland during 1968 in relation to 1967.

<i>Laothoe populi</i> Linn.	—same
<i>Saturnia pavonia</i> Linn.	—19 days late
<i>Agrotis exclamationis</i> Linn.	—about the same
<i>Diarsia brunnea</i> Schiff.	—1 week early
<i>D. rubi</i> View.	—1 week early
<i>Ochropleura plecta</i> Linn.	—18 days early
<i>Amathes baja</i> Schiff.	—16 days early
<i>A. c-nigrum</i> Linn.	—1 week early
<i>A. sextrigata</i> Haw.	—same
<i>Euschesis janthina</i> Schiff.	—early
<i>Noctua pronuba</i> Linn.	—same
<i>Cerapteryx graminis</i> Linn.	—10 days early
<i>Leucania impura</i> Hubn.	—early
<i>Apamea monoglypha</i> Hufn.	—1 week early
<i>Gortyna micacea</i> Esp.	—1 week late
<i>Hypena proboscidalis</i> Linn.	—13 days early
<i>Xanthorhoe montanata</i> Schiff.	—late
<i>X. fluctuata</i> Linn.	—very early record: 26th April.
<i>Lygris pyraliata</i> Schiff.	—same
<i>Dysstroma truncata</i> Hufn.	—one week early
<i>Crocallis elinguaris</i> Linn.	—late

*graminis* were well up in the second year while the catch of *Apamea monoglypha* was up by 300%. The catch of *A. xanthographa*, however, was well down that year. Amongst that Geometrids *Xanthorhoe montanata* and *Crocallis elinguaris* were the most notable late emergers in 1968 and that year the numbers of *Dysstroma truncata* Hufn. dropped from 20 to 6. The early record of *Xanthorhoe fluctuata* in 1968 is unusual.

Of the day flying moths *Saturnia pavonia* was nineteen days later in 1968 but this was, no doubt, due to the dull weather in the early part of May. Table 3 gives some indication of the 1968 season relative to that of 1967 for a few of the species taken.

#### Papers on Scottish Entomology 1967-68

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Northern Scotland—M. F. Claridge, J. M. Edgington, D. M. Murphy, p. 253

18.4.69

George Thomson (3689)

#### MANIOLA JURTINA (Linn.)—AN APPEAL

It is some years since I made a request for information about and specimens of *Maniola jurtina* (Linn.) (the Meadow Brown Butterfly) sub-species *splendida* B. White which started me on the serious study



of this butterfly. Much of the work on a species such as *M. jurtina* which is so variable is statistical and would be impossible were it not for the co-operation of friends who take the trouble to spend some time examining their specimens or collect a few extra specimens for me. Such is the nature of my continuing work on the butterfly and it is hoped that this request will stir some interest in a few more of the collectors who look on *M. jurtina* as the rather dull bug which throngs our fields.

The first problem concerns combination-forms in *M. jurtina*, the interesting feature in which two or more forms are found on the one specimen. I would be interested to know of specimens in which any of the following are combined—together with the data for the butterfly:

<i>nana</i> Stephen	<i>anommata</i> Vrtý.	<i>rectoformis</i> Thomson
<i>major</i> Leeds	<i>antiparvipuncta</i> Leeds	<i>costa-cava</i> Cabean
<i>brigitta</i> Ljunch	<i>erymanthoides</i> Strand	<i>brevipennis</i> Lempke
<i>cinerea</i> Cosm.	♂ <i>bioculata</i> Rebel	and
<i>pallens</i> Th.-Meig.	<i>addenda</i> Mousley	Gynandromorphs
<i>feminea</i> Graves	<i>fracta</i> Zweigelt	

The second problem concerns island populations, both in the British Isles and elsewhere. Unfortunately, this is more complicated and requires a statistical analysis of various characters of the species. However, if anyone would be prepared to help with this I will send him the necessary tables on request. I do not require information from the Isle of Wight—Mr Fearnough has already generously helped with this region.

Finally, I require specimens from the region indicated on my map which appeared in the *Bulletin (Bull. amat. Ent. Soc.* **28**: 81) as the range of the sub-species *phormia* Fruh. Help with this and the other problems already mentioned would be most welcome and anyone who has the time to do so can be sure of my fullest appreciation.

20.8.69

George Thomson (3689)



## EARLY RECORD FOR RED ADMIRAL

During the afternoon of 15th June, 1969 a Red Admiral (*Vanessa atalanta* Linn.) was seen in a garden at Aston-on-Trent near Derby. Normally this species is not seen until September in this particular locality. I was able to come quite close to this specimen and noted that it was extremely worn with a piece missing from one forewing. It is tempting to suggest that this individual may represent an instance of successful hibernation.

7.769

Keith Bradbury (2627)

## REARING THE ADONIS BLUE BUTTERFLY

(*LYSANDRA BELLARGUS* Rott.)

For a number of reasons, attempts I had previously made to rear this species from the egg had proved unsuccessful, so in 1965 I determined to make a real effort to succeed.

Maintaining the foodplant is the main difficulty encountered when rearing the larvae, the plants when dug up and potted generally lasting but a few weeks, even when protected from feeding larvae. The amount of green growth on the plant generally dwindles and finally disappears. In the summer of 1965 several pieces of chiltern turf were cut from the crumbling edge of a chalk-face where a small landslide had left the living turf overhanging but in fresh condition. The turf contained a variety of chalk species of mosses and flowering plants including the Horseshoe Vetch (*Hippocrepis comosa* Linn.)—the only known natural foodplant for the Adonis Blue. Pieces of turf were placed in 8 in. diameter saucepans with no drainage and were kept waterlogged through the winter in an east-facing sunny conservatory. Tall growth of grasses and other plants was periodically trimmed off and in one culture (out of four originally) the Horseshoe Vetch grew well. (Since using this method to establish foodplant, I have consulted the AES adviser on foodplants, Mr R. C. Dyson. He recommends growing the Horseshoe Vetch from seed.)

On June 14th two female butterflies were collected from a strong colony. They were enclosed on the growing foodplant, by tying curtain-netting over the top of the saucepan. The netting was soaked in strong sugar solution and frequently sprinkled with fresh water, and the chiltern turf was kept waterlogged, this makeshift cage being kept in a sunny, well-ventilated conservatory. The butterflies laid freely and were later released back in the locality where they had been captured. By early July the larvae had emerged and had pitted the leaves of the foodplant with yellow eaten patches and it became necessary to transfer them to cut foodplant. From this time onwards, the supply of fresh foodplant proved a considerable problem. The nearest known locality for Horseshoe Vetch growing in sufficient quantity was twenty-five miles from home, and even where it occurs it is difficult to collect. On steep broken ground the leaves are sparse and tiny, and on continuous turf they are so intermingled with other plants that the leaves have almost to be picked singly. Only under invading bushes, or where scrub growth has been recently cleared, do good lush clumps of isolated Horseshoe Vetch grow. These can be cut fairly freely.

To transfer the tiny larvae to cut foodplant they were swept off the growing foodplant on to blotting paper, by a light stroking movement with the hand over the whole clump. They were then picked up on a fine moist paint-brush and placed, twelve to a box, in plastic containers measuring 175 mm. x 115 mm. x 60 mm. (approximately). It was necessary to collect fresh foodplant twice a week, and frequent wet weather made

this an uncomfortable process, because to get to suitable spots for good plants meant walking through soaking waist-high grass. Drying out of the wet foodplant was difficult, and often not very efficient, and as the larvae reached their final instar, quite a few losses occurred—the larvae turning dark brown and dying. However, on 31st July the first fully-grown larva was set to pupate and it completed its pupation two days later. As pupae were formed and hardened out, they were placed loose in plastic boxes of the same kind as those used for larvae, and kept in a dark cupboard at room temperature. On emergence the butterflies had no difficulty in clinging to the sides of the plastic boxes and climbing up to expand their wings. The first specimen, a male, emerged on 20th August, and through the following fortnight the remaining 26 specimens emerged, with no losses due to crippling (as happens with some species when bred).

Once the difficulty over foodplant has been overcome, this species is, then, easy to rear, at least if the spring generation butterfly is used to obtain eggs. Overwintering of autumn generation larvae was not attempted, and might prove difficult. To anyone wishing to rear this species I would recommend the establishment of growing foodplant well in advance, and if the larvae are to be reared in numbers, the ability to make frequent visits to chalk or limestone localities for fresh foodplant. Additionally, one could experiment with alternative foodplant, once the eggs had been obtained.

29.8.69

T. S. Robertson (2417)



## LOCATING MUSEUM SPECIMENS FOR RESEARCH: A CASE STUDY

### Introduction

An important function of entomological collections is to conserve material of scientific importance, for use by research workers. Very large collections may have to be maintained in good order over long periods in order to satisfy a very small demand. One example of the working of this system is described in the present article.

### The Problem

In a piece of private research, the problem was to locate specimens of a very rare variation of a common British butterfly. References to a number of examples of this particular form in scientific journals, showed that it had been known since about 1880, and that at least twenty specimens had been placed on record as having been collected in Britain. To undertake the desired research it was necessary to locate and make drawings of at least thirty specimens. Since the specimens



would not be likely to be catalogued individually in collections, it was necessary to give a description, supported by a picture, which would enable a curator who was not a specialist in entomology, to search for them and have a reasonable chance of detecting them.

### The Method of Enquiry

Specimens were located in three ways—by direct communication with friends and acquaintances who were known to be collectors who specialised in this field of study; by sending a duplicated letter to well-known collectors who were members of the Amateur Entomologists Society or of the British Entomological and Natural History Society; and by writing to all the larger museums listed in the reference works as maintaining natural history collections. In writing to collectors it was sufficient to give a technical description of the butterfly concerned, but for museums a description and reference to a published picture were given in a letter having the following text:—

"Dear Sir,

#### Homoeosis in the Small Copper butterfly,

#### *Lycaena phlaeas* Linn.

*I am making a research survey of homoeosis in this species and am anxious to locate any specimens which may be held in collections throughout the country.*

*The particular variation in which I am interested is shown at pl 45 figure 26 of the "Natural History of British Butterflies" volume 2, by F. W. Frohawk, 1924, and is described by South "The Butterflies of the British Isles" as follows:—"A remarkable specimen taken some years ago . . . had a small patch of copper with a black spot in it on the under side. This gave one the idea of a clumsy attempt at patching . . ."*

*The form is a very uncommon one, and is rarely found in collections. If, however, you have anything which is in any way like this description, I should be interested to know of its existence.*

*Yours faithfully,*

*T. S. ROBERTSON."*

### The Response to the Enquiry

Forty-five specimens were discovered, an adequate number to undertake the required research. These included fifteen of the twenty which had been recorded in the scientific journals, the earliest specimen being one captured in 1895 and now in the National Collection at Tring. The forty-five specimens were located in the following ways:—

In the writer's own collection ... ..	4 specimens
In the collections of friends and acquaintances	23 specimens
Located by writing to private collectors ...	11 specimens
In the National Collection at Tring ... ..	6 specimens
In other museums ... ..	1 specimen

### The Part Played by Private Collectors

Apart from personal friends and acquaintances, enquiries were

sent to 44 private collectors, of whom 30 (68%) replied, six with positive results.

### **The Part Played by Museums**

In addition to the Natural History Museum at Tring, which houses the National Collection, nineteen museums were approached. To two of these museums, letters were addressed to Curators known personally to the writer. In the remaining cases a letter was sent to the Director (or Curator, as listed in the Directory). Sixteen replies were received, giving a response rate of 84%. Ten replies were received by return of post, a further four museums replied within one week. The two individually-addressed letters received replies after twelve days and thirty-one days. Three museums, including two large ones in provincial cities and one smaller museum, did not reply. Many of the replies included suggestions for further enquiries, and these were followed up.

Although only one specimen was detected it seems unlikely that other specimens remain undetected in museums. It is valuable to have established this.

### **Conclusions**

In a highly-specialised enquiry the response made by private collectors and museum curators was, with a few exceptions, prompt and very helpful. Most of the people approached went to considerable trouble in searching and in recommending further lines of enquiry. As a result of the help given it was possible to complete the intended research,

T. S. Robertson (2417)



## **RECORDING OF INSECTS**

In the course of supplying records of observations I have recently found myself wishing that I had a standard formula to use in describing numbers of insects observed. The use of terms such as "abundant", "common", "frequent", "numerous", "several", "few" etc., could be given varying interpretations by different people. Has our Society ever published a recommended formula? If not might the Council consider doing so, guided perhaps by members who might be keen enough to write giving their opinions?

To set the ball rolling we might consider the following:

Abundant = Very large numbers, say more than fifty.

Frequent = More than ten.

Several = More than five.

(Actual number to be given for five and under.)

1.10.69

P. R. Grey 3820)

## THE EFFECTS OF A NEW GOLF COURSE ON THE BUTTERFLY POPULATION

Basildon has been on the maps for years but it is only in the last decade that it has become a 'New Town'. It has been built primarily for the overflow of London inhabitants. As it is classed as a 'New Town' there has been a lot of development in the area.

When I moved here I wasn't a lepidopterist—I have only been one for two years. So by the time I took it up seriously I had seen most of the main developments. One of these was the Golf Course. The third hole of this runs along the back of my garden. The fence that separates the garden and the golf course is about a quarter of a mile long. Further up the hill is a wood running parallel with the fence. At one end of the wood is a golf green and at the other a ditch and a piece of land where buttercups grow in between the cutting of the rough. Over the brow of the hill the ground slopes away less sharply. The far boundary of the golf course is another fence beyond which a public footpath runs along the edge of a meadow bordered by a hedge. One end of the meadow is left uncut. The path at the other end I have named 'Butterfly Walk' of which I shall write more later.

I shall describe the effects of the golf course on the families of butterflies, giving a few notes on conservation.

Pieridae. The Large White (*Pieris brassicae* Linn.) occurred very commonly along the back of the wood where buttercups (*Ranunculus* spp.) and dandelions (*Taraxacum* sp.) grew unhindered that year. The first brood of 1968 was seen on 12th May but only in small numbers, in the opening of the wood. The Small White (*Pieris rapae* Linn.) was not affected because of its habit of flying in gardens where cabbage grows.

The Green-veined White (*P. napi* Linn.) is one species that has suffered because of the golf course. It occurred commonly with the other two species of *Pieris* but this year (1968) it has decreased on the golf course, perhaps because of the golfers who have hacked down the only patch of Jack-by-the-hedge (*Alliaria* sp.) in the vicinity. I have caught a female in a nearby piece of scrub land and reared a number of eggs through to pupae for release.

The Orange Tip (*Anthocharis cardamines* Linn.) has not decreased but, rather surprisingly, has increased.

Satyridae. The Ringlet (*Aphantopus hyperanthus* Linn.) disappeared in 1967, when I caught only one specimen. The Wall (*Diva megera* Linn.) and the Speckled Wood (*Pararge aegeria* Linn.) have declined although the Speckled Wood is still quite common. In 1967 the Wall was very common in the area just over the fence of my back garden. I have got larvae of both species for release. The Meadow Brown (*Maniola jurtina* Linn.) and the Small Heath (*Coenonympha pamphilus* Linn.) are as common as ever in the meadow.

Nymphalidae. This year of 'butterflying' (1968) started very surprisingly: after seeing my first Small Tortoiseshell (*Aglais urticae* Linn.)



on 24th March, I found three Commas (*Polygonia c-album* Linn.) on the scrubland previously mentioned. Since then I have got second brood ova. The Small Tortoiseshell seemed quite common, I have taken them all off the golf course and put them on the scrubland. Results have been quite promising: I have seen at least five flying round a nettle patch where before I had only seen them singly. Peacocks (*Nymphalis io* Linn.) were seen on 24th March and until 17th April, the first one I caught on the edge of the wood. I cannot be sure that they have been affected by the golf course but I have not seen any Peacock larvae.

Lycaenidae. The Small Copper (*Lycaena phloea* Linn.) has never occurred around the golf course. The Common Blue (*Polyommatus icarus* Rott.) has disappeared from a ditch at one end of the wood but still occurs in the meadow.

Hesperiidae. The Grizzled Skipper (*Pyrgus malvae* Linn.) has not declined in any way. A very common butterfly this year is the Large Skipper (*Ochlodes venata* Brem. and Grey).

The Butterfly Walk I so named for several reasons: the Common Blue abounds there, a bunch of Ragwort always sports the Peacock, Small Tortoiseshell and Red Admiral and occasionally a Painted Lady. Also I saw my first Small Copper there. and lastly I wish very good luck to those who are helping the British butterfly population in any way.

G. Wragg (4196j).

[The above was a runner-up in the competition for the 1968 Junior Conservation Prize.]

●

### METOPONORTHUS LUSITONISCUS CINGENDUS (KINAHAN, 1857) (CRUSTACEA: ISOPODA, ONISCOIDEA)—A LUSITANIAN SPECIES

The genus *Metoponorthus*, together with the genera *Trichoniscoides*, *Metatrachoniscoides*, *Scotoniscus*, *Oniscus* and *Porcellio* (*pro parte*), is considered by Vandel (1962) to be a lusitanian element in the fauna. Four of these genera, *Metoponorthus*, *Trichoniscoides*, *Oniscus* and *Porcellio*, are represented in the fauna of the British Isles.

Two species of *Metoponorthus* are present, *Metoponorthus* (*Lusitoniscus*) *cingendus* and *M.* (*Metoponorthus*) *pruinus*, *M. melanurus*, recorded on Howth Cliffs, Co. Dublin, (Edney (1954)), having been placed in a separate genus by Vandel as *Acaeroplastes melanurus* (Vandel (1962)).



Map: Distribution of *Metoponorthus cingendus* from Vandel, 1960.

- (1) Lizard Peninsula, Cornwall.
- (2) Welcombe Point, Devon.

*M. pruinosis* is of world-wide distribution, being absent only from polar regions. Although not a commonly encountered species, it has been found throughout the British Isles. *M. cingendus*, on the other hand, is very localised. Vandel (1962) records it from coastal areas on the Continent from Portugal up to Brittany, and in the British Isles from the Isle of Wight, South Devon, South Wales and the coast of Eire from Dublin to Achill Island (see map based on Vandel (1960)). Three further sites are given by Harding (1967): Lydstep Point, near Tenby, and Freshwater West, Pembroke, and Lundy Island.

The writer adds two records to the above, one a new county record for Cornwall. These are: Lizard Peninsula, Cornwall (N.G. Ref. SW/70 13), July, 1968, and Welcombe Mouth, North Devon (N.G. Ref. SS/20 18), May, 1967.

The site at Lizard was a wide, earth-filled bank, covered with grass, about  $1\frac{1}{2}$  km. from the coast, and *M. cingendus* was found along with the common species *Armadillidium vulgare*, *Oniscus asellus*, *Philoscia muscorum* and *Porcellio scaber*. At Welcombe Mouth *M. cingendus* was found in a similar location, and with the same associated isopod species.

Legrand (1949) found that the distribution of *M. cingendus* in Brittany coincided with the  $+5^{\circ}\text{C}$ . January isotherm. The January temperatures at Lizard and Welcombe Mouth are  $+7^{\circ}$  and  $+6.3^{\circ}\text{C}$ . respectively. These two English sites are also well within the limits for maximum altitude and distance from the sea that Vandel (1962) records as being a height of 800m. and a distance from the sea of 60 km., both records being from Portugal.

Aug. 69

R. J. A. Metcalfe.  
Trinity and All Saints' Colleges,  
Horsforth, Leeds.

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#### BANANA BAIT

When planning a butterfly hunting trip it is my practice to prepare bait well before-hand, usually about a month before the scheduled take-off date. This particular batch had to be really good, as my destination was the Tucuco Mission in the foot-hills of the Perijá range in Western Venezuela, where I had been informed by two collectors, who had previously visited this locality, of a high-flying white morpho, very similar to *Morpho theseus fruhstorferi* of Ecuador. They told me that this Morpho floated around the treep tops, and never descended lower than thirty feet. My intention was to draw him down within netting range with the aid of this special bait now in preparation.

Into a large wide-mouthed jar I placed about thirty very ripe, selected bananas. The jar, with the lid screwed down tight, was then placed in the sun for a three-day period, and each day I added a small quantity of beer to ensure rapid fermentation. On the fourth day the



jar was deposited in a cool place, and half a glass of rum and some brown sugar were added. By now it was really smelly, and whenever the jar was uncovered, I had enquiries from the neighbours as to what brand of home-brew I was now making up. Now came the time to add a shot of grape vinegar and some more sugar. My brew became darker each day, and now was of a rich brown hue. On close inspection I could observe a quantity of minute bubbles floating about which told me that my brew was ripe and ready to entice that high-flying Morpho out of the tree-tops.

The take-off date being still three days away, I spent this time in stacking all my collecting stuff in one pile, and talking my wife into going along with me. She is not too keen on these trips as she is definitely not partial to Indians of any breed, and especially Motilón Indians into whose territory I had to penetrate after that white Morpho. Eventually she reluctantly agreed to come, after I had promised not to trespass too deep into Motilón territory.

At 4 a.m. on the take-off day, as we traversed the almost deserted streets of Caracas, I could smell that bait back in the trunk compartment where I had placed it the night before, carefully padded, and with a small hole punched in the lid to reduce the explosion hazard.

It was still dark, and few people were about, so we made good time across Caracas and hit the road west to Maracaibo. As we started climbing, following the up-tilted highway, it became quite chilly, so presently I pulled into a coffee-joint and had to wake the wife up so that she could drink her coffee. Having crossed the top we started down the other side of the hills that encircle Caracas, and having passed through Tejerías and La Victoria, small towns still abed, we arrived at Maracay just as the first streaks of light began changing the colour of the sky behind us.

At Valencia we stopped for breakfast and to refuel. The puzzled but appreciative look on the service station attendant's face, as the bait aroma reached him, was well worth the bolívar tip, and I am sure that if *he* had been the white Morpho we would not have had to travel any further.

After an uneventful all-day drive we finally completed the 500 odd miles to Maracaibo, where we stayed overnight at my brother's house, as it was still almost 125 miles to Tucuco.

Again we made an early start and arrived at the Mission Station of Los Angeles del Tucuco around 8 a.m. After a lot of handshaking and back-slapping we stated our business there. Having been warned not to stray too far from the Mission clearing we at last, got off along the trail towards the spot given as the Morpho's stamping grounds.

Following the jungle trail for about a mile and a quarter we at length emerged in a clearing which seemed to match the description of the Morpho's hangout given by the previous collectors, so we proceeded to spread our bait about liberally, using up about half the jar. Continuing along the trail we netted quite a number of Ithomiids before

deciding to return stealthily to the clearing in hopes of at least being able to spot our *Morpho*. To our surprise the bait had completely vanished, though the strong smell of fermented bananas remained. Deciding that the only explanation could be that some jungle creatures larger than butterflies must have a taste for that sort of stuff, we repeated the bait-spreading operation and left my wife comfortably seated on a log at the outer edge of the clearing, screened off by a low bush, to keep watch on our bait and for the morpho's approach.

Following the trail anew, I started netting a few more ithomiids, but had not travelled more than a few hundred feet from the clearing when the most unearthly screams came from the direction where I had left my wife. Dashing back along the trail I was just in time to get a glimpse of four Indians making off into the jungle. Finally I got my wife calmed down enough to explain what had happened. Apparently these four Indians had stalked out of the jungle, gone down on all fours, and proceeded to lap up our bait.

We had figured on drawing down *Morpho* sp. with our special bait, but never on attracting *Homo sapiens* f. *motilón* to it. It *must* be good bait, but I never did see that white Morpho.

Harold Skinner (3416)  
Venezuela.



## COLLECTING IN THE CAMEROONS

### Part I

The Cameroons are a veritable paradise for the naturalist. The entomologist who goes on a collecting-trip to this part of West Africa will return home with more insects than he can hope to set for several months ahead, while the arachnologist will need hundreds of glass tubes in his luggage to accommodate just a selection of specimens. If the naturalist with a mild interest in reptiles and amphibians goes to the Cameroons, he (or she) is guaranteed to come back very severely bitten by the herpetology bug, if my example is anything to go by!

The botanist cannot go a yard without finding some new and beautiful plant to photograph, paint or preserve; the birdwatcher who has seen brilliant humming-birds, sunbirds and kingfishers only in museums can wake up every morning in the Cameroons and see them outside his window, where they are as commonplace as sparrows or blackbirds are here. For an angler there is fishing, and at least he does not need a licence; the student of the larger mammals will also find a rich source of material for study here.

In this series I shall confine my observations to butterflies and moths and spiders, since long descriptions of other groups of animals

are obviously out of place in an entomological journal. The insects alone, if fully described, would take up a whole issue—so I must of necessity be selective in describing the most interesting specimens among those I acquired.

The territory in which I collected can be divided up into two main areas: the tropical jungle of the lowland coastal region, and the temperate grasslands, scrub and bush area to the north, fringed by mountains about 5,000ft above sea level. The climate in this latter region is ideal for the European—an average of about 70° to 75°F. in the daytime, dropping to round about 60°F. or so at night, with hardly any humidity. The climate of the lowlands, of course, is just the opposite extreme, with temperatures in three figures (at Eshohi it was 115°F.) and the humidity practically at saturation-point. I thought I would never get used to it to start with, but after a few days I soon found myself becoming more and more acclimatised, and by the time I had left this region to go northwards I found the rapid change quite strange as I ascended.

One of the things which astonished me most was the fact that collecting generally produced much better results in the more temperate northern territories than it did in the jungle, quite apart from the fact that the jungle itself is an impenetrable tangle once you leave the forest pathways, and you cannot get very far. While there is, of course, a wealth of wildlife there, it is much less in evidence, because it has more vegetation in which to hide, and also a good many of them are high-flying forms, or arboreal species of the canopy. Some of the most beautiful butterflies of the jungle rarely descend to less than about fifteen or twenty feet, and trying to catch them with a net is a hopeless task.

The most popular method of collecting these high high-flying butterflies is, of course, to lay bait in the form of rotting fruit or decaying meat. It does not take very long for either fruit or meat to decay in that climate, so this was the method most often employed. In the dry season butterflies as well as other creatures seek out moisture, and large numbers of them will congregate round even a muddy puddle in order to imbibe a few drops of the reviving liquid. In the forests around Mamfe there were many such puddles, and I obtained a very large variety of butterflies from this part of the country. As one ascends the rocky path from the other side of the Cross River up to the village of Eshohi, six miles to the north, there are a number of small streams and pools along the way, and the vicinity of these was always a fruitful source of various forms of animal life, including several spiders which appeared to occur only in these particular places and never turned up elsewhere.

While I was staying at Fiango I had the opportunity of meeting Dr Peter Moore, who is engaged at the Helminthiasis Research Unit in Kumba, a few miles away. He and his wife, who were introduced to me by the Game Warden, Mr F. R. Mason, invited me to their house



several times, and on one of these occasions Dr Moore set up a mercury vapour light in his compound, and I had the most fantastic experience of light-collecting in my life, taking over 700 moths of over 250 different species. These ranged from various small and exceedingly beautiful geometrids to fabulous saturnids with a nine-inch wing-span, which at first I took to be bats! An account of that evening deserves an article to itself, so this will be described in Part II of this series.

I will start with some notes about my collecting in the forest around Lake Baromi, near Kumba. The first time I visited this area was in the company of Mrs Moore and her two children, when we went for a swim in the lake. By 9 a.m. the temperature was already over 90°F. and swimming was certainly cooler work than collecting, but both before and after our dip we managed to secure quite a few interesting insects and spiders. Mrs Moore and her children had been supplied with nets from her husband's office; these nets were about three times the size of mine, and I certainly would have found them very unwieldy to use, but they were not as heavy as they looked.

Spun over the roof of the boathouse was a huge spider's web, about five or six feet in diameter, in the centre of which was a tremendous Argiopid spider. I never did find out its identity, since it always managed to elude us. Every time I tried to catch it without destroying the web, it would run at a tremendous speed and secrete itself under the eaves. Since the top of the wall did not meet the roof, the spider could easily run across the three or four-inch gap into the inside of the boathouse, so Mrs Moore and I looked for it inside while the two children kept watch outside. The spider was about two and a half inches across the body, plus very long legs, but was, like all others in this group, perfectly harmless. The abdomen was light yellowish-brown, with darker brown bands each of which joined in the middle to form a point, so that there was a row of these V-shaped points down the middle of the back. The legs were also yellow, with black stripes—altogether a most handsome specimen. Unfortunately it kept well out of our way, and we never did succeed in capturing it.

Down at the water's edge I noticed some brilliant scarlet beetles, which bore a striking general resemblance to our soldier-beetles, and they appeared to be members of the Telephoridae. The body was about one and a half inches in length, and their antennae were longer than the body. They had a peculiar habit of running up to within a few inches of the waters' edge and basking in the sun until a wave lapped a little too close, when they would do a smart about-turn and run a few inches further up the beach. This was the only place I saw these particular beetles, and further than a couple of feet or so away from the water they were not to be seen.

Very few butterflies were in evidence in the clearing where the lake lay, but as soon as we re-entered the forest which fringed the lake on all sides butterflies appeared, and while the majority flew too high or too far into the dense thicket to permit of our catching them,

a number of other kinds kept to the forest path and flew low enough—or settled for long enough—to enable us to catch them. I was most disappointed to be unable to capture a huge *Hebomoia*-like Pierid, which careered backwards and forwards above our heads several times, as though deliberately tantalising us. This magnificent creature was fully six inches across the wings, which were pure white with a brilliant deep orange patch on the tips of the forewings, outlined with a purple band. Another fabulous butterfly which was an extremely high and fast flier was the well-known Mother-of-Pearl (*Salamis parnassus aethiops*), of which I succeeded in obtaining only one specimen, and that was by sheer luck.

The *Acraea* group, with their brilliant blues and softly-rounded wings, were in great evidence, and I obtained more than a dozen different species from this area alone. They would seem to be Africa's challenge to the South American *Heliconius* group, which they greatly resemble in shape, though their colouring is entirely different and they have not the velvety appearance of their New World counterparts. These dainty, slender-bodied butterflies are among the most beautiful of all the West African species. The butterflies of the *Precis* group, with their seasonal dimorphic forms, are also very common in the Cameroons, and I found a large variety of them not only here in the forest around Lake Baromi but also along the forest path to Eshobi and even in the northern uplands.

Other forest species included brilliant yellow Pierids and the small blue Acraeids. Both these groups were also very common around Eshobi. They were still to be found in the upland regions, but were there far less abundant.

The highlight of my day collecting butterflies in the forest around Lake Baromi was my first (and last!) glimpse of a fabulous *Aristolochia* species. This group is characterised by semi-transparent rounded wings, veined with jet-black. These butterflies have a most graceful undulating flight, their fragile build preventing them from being strong fliers. Unlike the *Charaxes* with their thick, heavy bodies and powerful wings, the *Aristolochia* has a slender abdomen with a tiny, nipped-in waist, and long, slender antennae. Had this butterfly crossed our path it would have been easy to capture, but, perversely, it kept to the thick bush at the side of the path, several yards into the thicket, where it was impossible to follow on account of the tangled mass of thorny undergrowth. This on the left-hand side of the path as one descended towards the lake, was enough in itself; but on the right-hand side the edge of the path dropped steeply down as it plunged towards a ravine, and in places there was a sheer two-hundred foot drop. The rocks here were so completely hidden by masses of vegetation that one could unwittingly imagine it to be firm ground, affording a foothold. However, I was warned about this, and therefore kept to the path instead of risking breaking my neck.

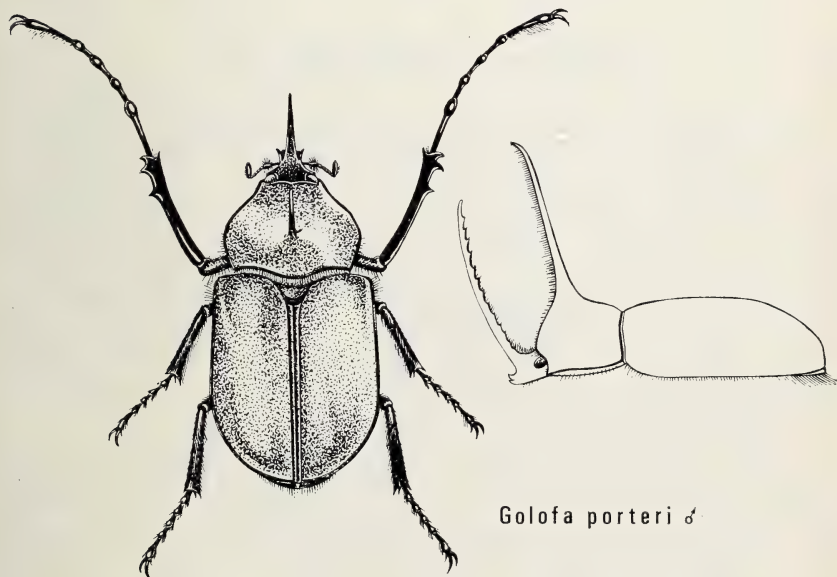
In the next article in this series I shall describe the results of MV

collecting at night, and in Part III I shall be talking about the butterflies, moths and spiders of the Eshobi region, followed in the fourth and last part of this series by a description of collecting in the mountain grasslands of Bamenda.

Joy O. I. Spoczynska, FRES, FZS (751)

### **GOLOFA PORTERI**

This large Scarabid belongs to the Family Dynastidae, the males of which very often possess large projections or "horns" on the pronotum and head, whereas the females are smaller and without projections.



*Golofa porteri* ♂

The above drawing was made from a specimen from Venezuela. The beetle is black, except for the elytra, scutellum and pronotum which are a light brown colour with margins of darker brown to black. The underside, legs, antennae and pronotum horn are to some extent covered with long yellowish hairs. Length 60mm. the horns being 35mm. (on head), and 30mm. on the pronotum.

It would be very interesting to know the use (if any) of the horns and to what use the long front legs are put as they appear far too long to be used for locomotion.

26.4.69

J. Cooter.



## WOOD WHITE IN PILLBOXES

According to South's *Butterflies of the British Isles* the above named species does not like the pillbox, and will not settle down therein. In May of this year myself and a friend searched for the Wood White (*Leptidea sinapis* Linn.) at a wood in Northampton where we found males to be quite common, we found no females owing to a late season. The males we took all settled down in the pillboxes, so is South right or is this an isolated case?

6.6.69

C. C. Penney (3880j)

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## EXPEDITION TO SPAIN—JULY 1968

For many reasons Spain offers great attractions to the entomologist. The Pyrenees are a natural barrier between the Iberian Peninsular and the rest of Europe; there has been movement of North African species into the area so that many have now become part of the normal fauna; the collector is almost assured of hot sunny days, plenty of insects and hotel bills which will not eat too quickly into his currency allowance. Roads have improved greatly over the last few years and generally the tourist is well catered for. So weighing things in the balance we decided to make Spain our target for 1968. "We" finally was reduced to W. L. Coleridge and myself, strikes in France and other matters having taken their toll of other possible adventurers.

As in other years, Coleridge generously provided his car as a means of transport and we drove down to Newhaven on the 28th June only to find that the car ferry had broken down and it would be a French boat some hours later which would take us to Dieppe. Fortunately the French train awaited our arrival and just before mid-night we entrained for Biarritz, arriving there at 11 a.m. on Saturday morning. Our first target was to be the Sierra de Albarracin some 200 km east of Madrid near to the City of Teruel. Dr de Worms had visited this area in 1966 and found it very fruitful. Driving via Bayonne we climbed into the Basses Pyrenees on the road to Pamplona. The slopes and valleys are well wooded and the sun was blazing hot when we stopped for a roadside meal some distance north of Pamplona. By the roadside we saw the Wood White, *Leptidea sinapis* Linn., the Chalkhill Blue, *Lysandra coridon* Rott., and several Lulworth Skippers, *Thymelicus acteon* Rott. Our next stop for a break in driving was on a very dry and bleak hillside north of Zaragossa. A short scrubby vegetation dotted with tall



Asphodel lilies yielded some very large Meadow Browns, *Maniola jurtina* Linn. of the form *hispulla* Hbn, the Marbled White, *Agapetes psyche* Hbn, and the Large Wall, *Dira maera* Linn. A few Clouded Yellows were migrating north and we took *Colias croceus* Fourcr., some of which were the form *helice* Hbn. The heat on this central

Spanish plateau came as a shock and we were glad to drive on with windows open and blower going at full blast. Being so much later than we had anticipated because of the delayed boat we did not consider trying for a hotel at Zaragossa but as we were making fairly good time we decided to press on. The road was straight and well surfaced and virtually devoid of traffic. South of Zaragossa we stopped again to look at a spot where the North African butterfly, *Chazara prieuri* Pierret, was alleged to fly. The road alongside the railway and the whole terrain was arid with a few scrubby patches of grass and bushes in the hollows. A dried up water course ran under the road and here were a few butterflies including the Long-tailed Blue, *Lampides boeticus* Linn., and some newly emerged *Brintesia circe* Fab., the largest of the Satyrs. The Spanish race seems to be smaller than those I have taken in France. I stumbled on a Crested Lark's nest under a dried tussock and found it had five eggs. This place seemed even hotter than our previous stop and we made good use of the water bottles before moving on towards Teruel. Mile after mile of straight road, fairly well surfaced, rolled by and despite it being Saturday we saw little or no traffic and even the small towns on the route seemed deserted. It would not do to take a substandard car on such a trip as one could easily be stranded. Petrol stations are long distances apart and one would have to wait a long time for assistance from other travellers. We arrived at Teruel as dusk fell and found the city full of people, it being a day of fiesta. All the hotels were full so we decided to press on to Albarracin. This meant retracing a few miles of road and then turning off across the plain towards the Sierra now disappearing in the gloom. We entered a winding gorge at last above the River Guadalaviar (although I did not realise this at the time) and by a winding narrow road came to Albarracin. The fiesta had also made its impact here and the only hotel was full and there was "no room at the inn" either. We decided to sleep out and drove through the tunnel at the end of the town and pulled off the road by the river and prepared to sleep. We were soon disturbed by a light and three "scouts" who offered to help us, thinking we had broken down. Using a mixture of Spanish, French, German and English we managed to converse and spent the rest of the evening round their camp fire by the stream, drinking coffee, playing a mouth organ and swapping yarns. It appeared they knew the area quite well and were also interested in butterflies. We finished the evening, about mid-night, catching crayfish in the river using a torch light. There is not much wrong with Spanish youth if these were examples. In the morning we were able to get a room in the Meson de Gallo in the town and then made off back through the tunnel and collected all day along the roadsides between Albarracin and Noguera. There is quite a lot of vegetation along the river but away from it the slopes are parched and arid with typical xerophytic plants growing in patches where the soil has gathered. There were quite a few butterflies on the wing and many were new to me. *Agapetes ines* Hfssgg. and *A. lachesis* Hbn. were



abundant in a quarry by the roadside and a few fast flying *A. psyche* Hbn., past their best, were also ranging the slopes. Everywhere was the Gatekeeper-like butterfly, *Pyronia bathseba* Fab. fluttering along the roadside and among the thorny bushes. I saw and captured my first *Pandoriana pandora* D. and S. This is a majestic butterfly, sailing above the ground too fast to chase and ranging across the countryside as if it had no home. It is only when it settles upon some thistle head that one can attempt capture. Although so similar in appearance to *Argynnis paphia* Linn., our own Silver-washed Fritillary, its habits bear no resemblance. Another exciting Fritillary taken by Coleridge was *Fabriciana adippe* Rott. of the form *chlorodippe* H.S. This form has the brown on the underside replaced by green and is a very beautiful insect. The upperside colouration also seems to be much more intense than that of the typical form. I also took, for the first time, the small fritillary *Brenthis hecate* Schiff. They fly quite quickly low over the ground with a skimming flight and look very orange on the wing. In the woods by the river I took the White Admiral, *Limenitis anonyma* Lewis, and saw the vivid flash of a male *Gonepteryx cleopatra* Linn. There were also plenty of Blues and including a species new to me *Aricia montensis* Vty.; the Adonis Blue, *Lysandra bellargus* Rott., and the Small Blue, *Cupido minimus* Fuessl. was very common. I caught also one male *Anthocaris euphenoides* Stdgr., the beautiful Orange Tip. I got a wasp of the *Pollistes* sp. trapped inside my shirt and was stung across the stomach several times before I killed it. Along the road a few birds were to be seen including our Blackbird and one Bee-eater. We found collecting very hot work as temperatures were very high and away from the river there was no cover at all. Towards evening we drove back to our Scout friends' camp and had a swim with them in the cool clear water of the Guadalaviar. The river is rich in trout and dace (or a similar fish) and I disturbed several large Edible Frogs. Back at the inn we had a simple meal and retired to bed. During the night I had further entomological experiences and in the morning we decided to try to get in at the Hotel Azagra back in the centre of the town. This was the only hotel and we got a very nice room with shower for about 25s. a day and spent the rest of our stay here.

On the following day we again drove along the gorge by the River and at our first stop we met Dr Lionel Higgins and his wife who were staying at Bronchales, some 30 Km away in the mountains. We arranged a further meeting and then drove off towards Noguera and took the left-hand branch of the road towards Moscardon. This was a spot mentioned by Dr de Worms as being worth a visit. We took the rough road leading to the village and after a short distance came out into a large grassy valley. The river lay at the bottom of the slope and, above, the hills were clothed with Pines. The grassy meadows were alive with butterflies. A further new species for me was *Coenonympha iphioides* Stdgr. which is abundant here. The commonest butterflies however were *A. lachesis* and *A. russiae* Esp. which were emerging as

we walked among the grasses. I found one female of *A. russiae*, with her wings still unset, in copulation. Also skimming above the grasses were *B. hecate* and *Mellicta parthenoides* Kef., the latter a very small form. Several *P. pandora* were observed dashing along and at a group of thistles near a stone wall I was able to net two, also several *F. chlorodippe*, all males. An interesting find here was a large Oil Beetle on the flowers of Sage, *Salvia* sp. They were about 2½ inches long when extended and black with bright red bands. I saw several feeding as I walked along.

At the bottom of the valley where the river ran, a dam formed a large shallow pool which was alive with tadpoles and adult Moor Frogs. These were croaking loudly and could be heard at a distance. Brilliant crimson Darter dragonflies skimmed over the water and on the damp mud were swarms of the Blue, *Plebejus argus* Linn. On the several stunted Sloe bushes (*Prunus* sp.) growing near the water I found batches of the eggs of the Black-veined White, *Aporia crataegi* Linn. The adults were there in copulation clinging to the bushes or grasses and several other females were laying. I also found un-emerged pupae. The bushes were so small that I wondered how they could hope to support the masses of larvae which would result from the eggs laid. Also on those bushes were the small larvae of the Swallowtail, *Iphiclides feisthameli* Dup. These lie down the centre rib of the leaf and are well camouflaged by their dull green colour. Climbing up towards the pine slopes I disturbed a pair of eagles whose nest was in the trees. It was not possible to identify the species but later Coleridge saw one carrying a snake back to the nest. A dry gulch ran up along the edge of the trees and with the sun now very hot this became like an oven. The butterflies moved freely along the gulch down to the meadows below and one had only to wander slowly backwards and forwards to net a fair sample. A new Blue I spotted here was the almost white *Lysandra nivescens* Kef. which is like a pale version of *L. dorylas* Schiff. It flies fairly fast and low over the white stones of the slopes and is very difficult to follow with the eye. I failed to capture one but Coleridge secured two specimens and gave me one. The other pale Blue here was *Lysandra coridon arragonensis* Gerh., which appeared to be just emerging. We had hoped to take *L. coelestissima* Vty., peculiar to this part of Spain, but were undoubtedly too early. Several Satyrs were about including *Hipparchia alcyone* Schiff., *B. circe*, *Hipparchia semele* Linn. (the males being very dark on the upperside), and *Dira maera* Linn. The morning had been hard work and we returned to the car and took the left fork of the track along the valley parallel with the stream until we reached a large Sloe thicket and beyond lay a pine wood with a path running alongside the stream. Here we stopped for lunch in the shade of a giant pine. All around us during the meal there were Dark Green Fritillaries, *Mesoacidalia charlotta* Haw., searching the grasses where the violets, *Viola* sp. grew. I have never seen this butterfly so plentiful. After the meal we walked up into the wood and all along the pathway flew Marsh

Fritillaries, *Euphydryas aurinia* Rott., of the race *beckeri* Led. These are much redder in colour than our own native race. I found Devilsbit Scabious, *Succisa pratensis* Linn., growing under the trees in the shade and plenty of Honeysuckle, *Lonicera* sp., both food plants of this butterfly. Along the stream the vegetation was quite thick and higher up marshy areas supported thick grass and rushes where there were several worn *Erebia triarius* de Prun on the wing. Again the race here has been named *Ssp. granjan* Obth. I also saw a few *L. anonyma* sailing round the Honeysuckle bushes and both species of Beehawk, *Hemaris tityus* Linn. and *H. fuciformis* Linn. On the Bedstraw (*Galium* sp.) by the path were several full-fed larvae of the Humming Bird Hawk, *Macroglossa stellatarum* Linn. These I eventually bred out on my return to England. The slopes of this valley had large open areas among the Pines and these had a carpet of Horse-shoe Vetch, *Hippocrepis comosa* Linn., and there several *Colias australis* Vty. flying low over the ground seeking places to lay their eggs. On these slopes I took my first specimens of *Euphydryas desfontainii* Gdt.—these are like a very large Marsh Fritillary but much paler than the *E. aurinia beckeri* that were lower down the valley. This whole area proved a wonderful place for collecting, having a good range of habitat and masses of insects. We paid a visit here on two further occasions, the second of which enabled us to have lunch with Dr and Mrs Higgins by a natural spring by the stream and to collect with them afterwards. I added two further species to our tally on that occasion, the very localised Blue, *Plebejus pylaon* Frhst., the form being much smaller than the *ssp. trappi* which I took the previous year on the *Simplon*; and a Skipper, *Reverdinus marrubii* Rbr. (*boeticus* Rbr.) which Dr Higgins pointed out to me. There were about six species of Skipper (*Hesperiidae*) flying along the dry paths. On the wing they are so very difficult to pick out and just about as difficult to name when captured.

Our evening was spent in driving up the dusty track from its start at Noguera through thick pine woods, the home of the *Erebia zapateri* Obth., to Bronchaes for an iced lager in the company of Dr Higgins and his wife and a chat over the species taken and likely terrain for the morrow. We were too early for *E. zapateri* which is an August insect but our Scout friends, whom we had brought with us to Bronchaes—as they were changing camp—insisted that this area was the home of the Apollo, *Parnassius apollo* Linn. We were anxious to take specimens of this butterfly as the Albarracin race is very large and often unusually marked. Dr Higgins said that he had not noticed any in the Bronchaes area so the following day we started early and drove through Noguera and up the mountain road towards Orihuela. We passed a huge apiary on the hillside of several hundred hives, all unpainted and in rows, and drove along a precipitous road with red sandstone cliffs above us and a sheer drop below. At the bend in the road there was a small open area where we were able to pull the car off the road. There were now trees on the slopes and the open area



was well grassed with a steep stony slope behind it and at the side a track leading up along a stream which tumbled into pools and spilled out over rocks down the mountainside. There were plenty of butterflies here among the tall orchids and clumps of Tufted Vetch (*Vicia sp.*), Fritillaries which included *Mellicta athalia* Rott. and *Fabriciana niobe* of the form *eris* Meig. A new Blue which was here in plenty was *Lysandra amandus* Schn. (*icarius* Esp.) which haunts the clumps of Vetch. The males are a brilliant blue while the females are almost black. *P. pandora* was quite common here but still going like the wind and several Queen of Spain Fritillaries (*Issoria lathonia* Linn.) sunned themselves on the path, rising as we walked along and settling again in front of us. The path passed a large sugar-loaf rock and then opened out into a wide grassy valley through which the stream ran. The slopes were covered with Horseshoe Vetch and the stream-side with orchids and marsh flowers and clumps of Cotton Grass. Here I netted a fresh *I. feisthameli* male and then after a long chase caught my first Apollo. It was a female, huge and bearing two red spots on the costa of the forewing rather like the markings of *P. phoebus* Fab. Later I caught a male marked in a similar way and another with orange replacing the red in the spotting. The butterfly was not common but every now and then one would catch sight of one drifting in the thermals along the valley, drifting until one gave chase. At the end of the valley the pine woods again encroached and the slopes were much drier. As I walked along a large blue butterfly came towards me and straight into the net. At first I thought it was another *L. amandus* but it was much larger, and I realised it was a female of that very rare species *Iolana iolas* Ochs. It was in perfect condition and I later learned that the species had not been taken in Spain for nearly half a century. As I knew its food plant was the Bladder Senna, *Colutea arborescens* Linn. I searched for this shrub and found it growing under the pines. Several of the bladders appeared to have larvae within so I collected a few samples. Later these were very apparently the home of *Lycaenid* larvae but when they emerged they were all *Lampides boeticus* Linn. the Long-tailed Blue, so my female had not begun to lay her eggs. Later this valley should be ideal for other Blues as *L. arrogensis* was just emerging. It was now very hot and I had a bathe in one of the pools before returning to have dinner under the trees with Coleridge. He had damaged his net and changed the net bag for one of mine. Unfortunately, the frame got left behind the tree where we sat, just off the road, and awaits the next entomologist to visit this delightful spot. In the afternoon we drove further towards Orihuela and in the middle of the pine woods we came to an opening each side of the road with steep slopes above and below the roadway. Here we netted several Apollos and some freshly emerged Large Coppers, *Heodes alciphron* Rott. (ssp. *gordius* Sulz.). The form is a brilliant one and large in size. I also caught two Wall Lizards, on the rocks beside the road. Another move towards Orihuela brought us to an open pine forest flanking the roads on each

side with a large area of level ground. There were not a lot of flowers but large patches of a Ground Ivy (*Ajuga* sp.) which was attracting a lot of butterflies and other insects. These included a large number of *C. iphioides*, *I. lathonia*, *A. lachesis*, *E. triarius* and *Strymon acaciae* Fab. We went on as far as Orihuela which appeared to have as its industry the sawing up of timber from the surrounding forests. We saw our first clouds forming here above the forest and a storm broke as we made our way back to Albarracin. I had a mild attack of Spanish tummy that night which was settled by the quick use of a certain doctor's Chlorodyne (an indispensable remedy).

The following day broke with a blazing sun again and we made a short trip up the gorge just outside Albarracin and crossed the river by a stone bridge and entered a dry gulch at right angles to the river. Among the stones were growing thick clumps of flowering plants, most of them being "garigue" type scrub with scented leaves and small nectar bearing flowers. These were smothered with butterflies—*Strymon ilicis*, *S. acaciae* and *S. spini* representing the Hairstreaks; *H. alciphron* was very common and *P. bathseba* was everywhere. Fritillaries were moving along the gulch and I saw one *L. nivescens* which eluded me. Flying along the steep sides and occasionally settling were several *A. psyche* and one or two *A. ines*. We climbed right to the end of this valley until it opened into some upland meadows, stony and windswept. The heat was intense in the gulch and we decided to go down below Albarracin to have a look for *C. priouri* which is recorded from the dry slopes bordering the roadway. We drove down through the town and skirted the foaming river for about three miles and then stopped to explore. The area away from the river was again very arid, stony and hot. We were obviously too early for *C. priouri* but I found another new species, *Hyponephele lupinus* Costa, a species very like *H. lycaon* Kuhns. which I had taken the previous year in Switzerland. The male has a very distinct dark scent mark and the one female I took had none of the rich colouring of *H. lycaon*. The Chalkhill Blue, *L. arragonensis*, was also flying here in a small dry meadow together with the Green Hairstreak, *Callophrys rubi* Linn., *Lycaena phloea*s Linn. form *eleus* Fab., *L. anonyma* (by the river), *Syntarucus pirithous* Linn (rather like the Long-tailed Blue) and several newly emerged *B. circe*. Several Bath Whites, *Pontia daplidice* Linn., were also flying about and freshly emerged *Melitaea didyma* Esp. In the trees by the river we heard the call of the Golden Oriole and then saw two males chasing each other among the trees, flashes of gold in the shafts of sunlight. A solitary fisherman was casting over one of the large pools using a long rod reminiscent of the Thames Roach Pole. Above the gorge were tall red sandstone cliffs and crowds of Choughs flew along its face, filling the air with their harsh cries. A telegraph line ran on poles along the valley and one of these poles was a point of attraction for the *B. circe* which used it as a landing ground; I have noticed the same usage in Provence. Probably the poles become nice and warm but not quite as

hot as the rocks around and prove to be a more comfortable settling place. As the heat of the day became more unbearable, Coleridge returned to the hotel to catch up with some setting and I drove off along the road crossing the river at Albarracin going south. It lead up into some very dry hilly country and some of it appeared very wild. At about 2 miles from the town I saw a sign on the roadside indicating some prehistoric cave paintings so parked the car beside the road and, following the signs, crossed a sandy meadow where a large hoard of children were camping and entered an open pine wood. The path was blazed with signs and I eventually came to a giant hill of sandstone rock with a rough path marked up its face. This led to the small cave where some faint wall paintings of cattle and men were protected by strong iron railings. The light inside the cavity was too poor for photographs and I left a little disappointed. In the wood I found several interesting orchids growing and caught a fresh *L. anonyma* and saw one or two *P. pandora* flying by. The sandy meadow produced a few *A. russiae* and masses of a small Ant Lion which rose from the dried up grass clumps in small clouds. On the grasses were also large numbers of small Chafers (Coleoptera). Suddenly the sun went in and I got back to Albarracin just before another storm broke. In the hotel, each evening was devoted to setting our day's catch, eating a four course meal in which steak seemed always to figure (there was a big bullfight each day in Teruel during the Fiesta which may have been the reason) and talking. We met a Dutch geologist who spoke English well—he was working with students in the area—and had several long talks with him, putting the world to right. We had found Albarracin and its environs of great interest and very fruitful but began to find the heat oppressive and that evening decided to make one last trip to Moscardon and then leave for the North and visit once again the National Park of Ordesa in the High Pyrenees. We had been there some years ago with my father and Alan Kennard for a fleeting visit and knew it would be worth another investigation. Our last visit to Moscardon was as interesting as our others though we found no new species. I was able to photograph the large black bull which lorded the herd feeding in the valley and a look at his forward-pointing needle horns made me appreciate that being a toreador could not be all honey. I had a last swim in the Guadalaviar and a look around the ancient town and we packed for an early departure on the morrow. I think I had enjoyed our stay at Albarracin as much as any of our ventures and hope one day to return there. The town is now a national memorial—it has a history bound up with the Moors and the Kings of Arragon. Its ancient fortress wall climbing across the slopes, the town built almost into the mountainside, the narrow streets which are no more than an arms' span in places and the ancient houses and Cathedral are well worth a visit in themselves. (To be continued)

P. W. Cribb (2270)



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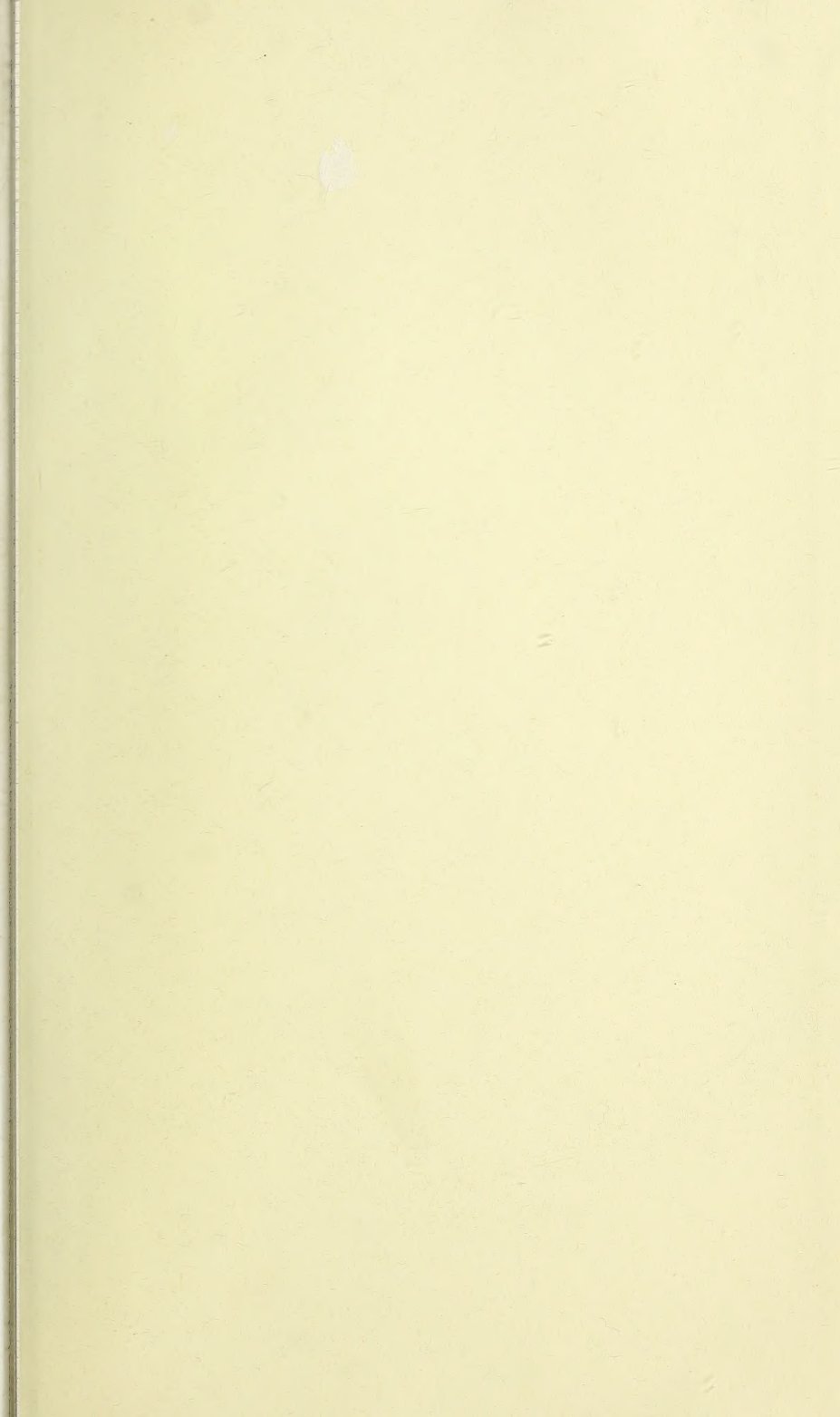
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